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History of
**ANIMAL PLAGUES OF
NORTH AMERICA**

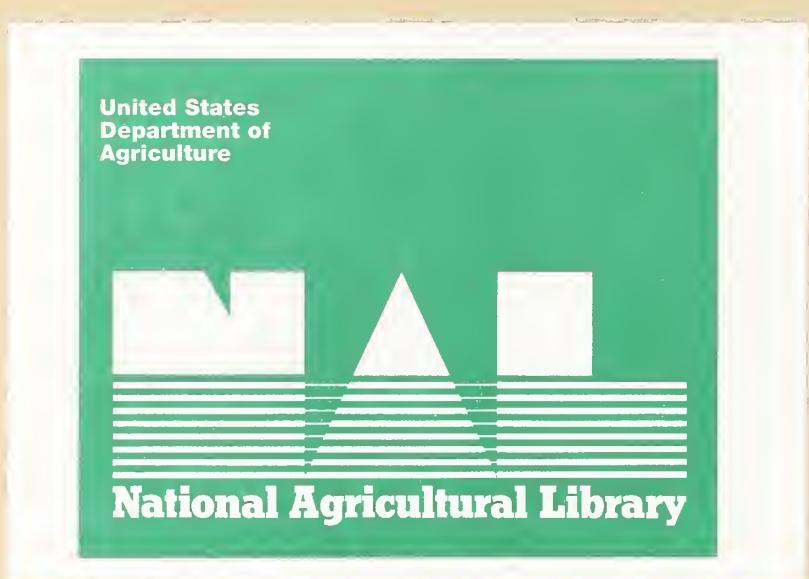
**With an Occasional
Reference to Other
Diseases and
Diseased Conditions**

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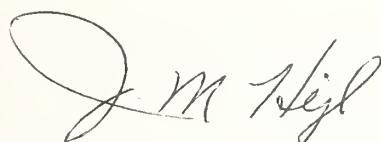
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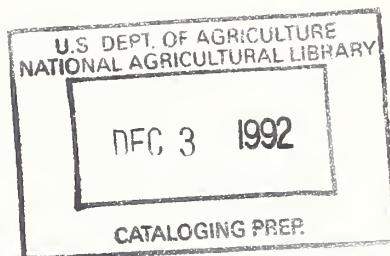
FOREWORD

Dr. Bierer's History of Animal Plagues of North America was the outgrowth of one of his hobbies. It was copyrighted and published with very limited distribution. In recent years, the material in the publication has become increasingly valuable in discussions relative to animal health activities. Because of its value, we have asked permission to reprint the History and make it available to veterinarians in regulatory animal health work.

We commend Dr. Bierer for his excellent compilation of information and bibliography, and we thank him for his permission to reprint the History.



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The Author

Dr. Bert W. Bierer graduated from the University of Pennsylvania in 1934 with a degree in Veterinary Medicine. He worked for the U.S. Department of Agriculture from 1934 to 1947. He was a Federal Meat Inspector in a plant in Baltimore for a few years, then served in several States for the Bureau of Animal Industry during the early years of the tuberculosis and brucellosis eradication programs.

In 1947, Dr. Bierer accepted a position with Clemson College in South Carolina. At present he is Professor of Poultry Science and Laboratory Director with the South Carolina Experiment Station at Columbia.

Dr. Bierer has also published "A Short History of Veterinary Medicine" through the University of Michigan. He has recently completed and is publishing a book on South Carolina Indian Lore.

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History of ANIMAL PLAGUES OF NORTH AMERICA With an Occasional Reference to Other Diseases and Diseased Conditions

INTRODUCTION

Much of the material herein presented has long laid buried within the many old agricultural, veterinary and medical journals and books. Aside from being interesting material, it should have a certain instructive value.

Arrangement, other than chronologically, in sharp contrast to most works concerning veterinary medicine, has deliberately been avoided, as it is the opinion of the writer that in this manner a general understanding can be arrived at that can be reached in no other manner.

What greater proof could there be of the necessity for the existence of the veterinary profession of America than a factual demonstration of the existence of animal plagues practically since the inception of our country—plagues that so increased in intensity during the latter half of the nineteenth century so as to seriously threaten the quantity and quality of our livestock.

It is no conjecture, no assumption, but a statement based upon concrete facts, to say that if it had not been for the timely intervention of veterinary science in America, all the animal plagues of Europe would have become so deeply enrooted in our livestock so as to make eradication futile and efficient control questionable.

PART I—PERIOD FROM BEFORE COLUMBUS TO 1800

INTRODUCTION OF DOMESTICATED ANIMALS.—What plagues and other diseases might have befallen the larger animals of the Americas before the coming of the white man will always remain a matter of conjecture. It has been definitely proven that mammoth animals roamed the lands of North and South America during the earlier ages. The horse, which long ago inhabited our continent, for some reason became extinct and was replenished by the white man.

Columbus had a horse, a bull and several cows and possibly other animals with him during his second voyage in 1493. Horses were introduced into Florida in 1527; horses and swine into Florida in 1538; cattle and swine into New Foundland and Nova Scotia in 1553; cattle, horses and swine into Acadia in 1604; sheep into Jamestown in 1609; goats, swine and chickens into the Plymouth colony in 1620, etc. (1).¹

EARLIEST RECORDS OF DISEASES.—Animal diseases are seldom mentioned in the literature of the colonial period. Noah Webster (who originally produced Webster's Dictionary) in his "Brief History of Pestilential Diseases" (published at Hartford in 1799), and, George Fleming, prominent British veterinarian, in his "Animal Plagues" (published at London in 1871), leave us the best and most complete descriptions of animal plagues that occurred in America previous to 1800.

1656: A strange epizooty was observed to affect the pelicans in the West Indies. So mortal was the disease that their dead bodies covered many islands (2).

1699: Widespread influenza in the human species all the previous winter. Catarrh among horses, and then among people (2).

1732: A very general epidemic of influenza overspread nearly the whole world, traversing it from East to West. The horses were seized with the catarrh before mankind in America where it began in New England about the middle of October, and travelled southward, into South America, much the same as it did in Europe (2).

1766: DISTEMPERED CATTLE - POSSIBLY TEXAS FEVER.—In 1766 the legislature of the State of South Carolina passed the following law: (3) "To prevent the inhabitants of South Carolina from driving cattle to range and feed in the province - Whereas much loss or damage has often ensued to the inhabitants of this province from distempered cattle being drove through the same - for remedy whereof, etc., no person or persons whosoever shall drive any cattle into this province or from any county or another without having a certificate, etc., that the animal is sound, etc., within five miles of the place whence they came."

In 1795, "Whereas it is found by experience that such certificate is insufficient for remedy, etc., no person whoever shall hereafter drive any cattle into North Carolina between April 1 and November 1 from either South Carolina or Georgia - No person shall hereafter drive any cattle from those parts of this State, where the soil is sandy or growth of the timber is of a different kind, between April 1 and October 1; nor shall any person hereafter within the same time drive any cattle from the highland parts of the State into those parts where the long leafed pine is the natural growth, etc."

¹ Numbers in parentheses refer to Bibliography, p. 84.

1768: HYDROPHOBIA - DISEASE OF HORSES.—Hydrophobia was alarmingly frequent in Boston and other places; at the same time horses were affected with a disorder of the head and throat, which proved fatal to many (2).

1769: In America some cases of canine madness were observed (4).

1769 to 1779: SPANISH STAGGERS - APPARENTLY TEXAS FEVER.—From the letters of St. John De Crevecoeur, written between 1769 and 1779, the following interesting information concerning the origin of Texas fever disease in North America, then known as Spanish staggers, is given (5): “Our cattle are not subject to so many diseases as yours. I am not learned enough to characterize those to which ours are subject. What we call the Spanish staggers is the most dreadful; it is their plague. Some years ago a Spanish vessel was cast on the coast of Carolina. The hides it contained communicated an infection which had been hitherto unknown. Now and then it broke out in those provinces. I have heard it asserted that they have begun to inoculate the cattle for this disorder with what success I know not. A few years ago the proprietors of the great banks meadows of Philadelphia were sent to fetch lean cattle from there in order to fatten them on their rich bottoms, but the severe losses which the northern people upon the road met with in consequence of the infection made them rise up in arms and oppose their passage. Trade has been since interrupted.”

FLIES ATTACK CATTLE.—De Crevecoeur also relates (5); “A variety of blue flies attack the cattle and drive them out of their pastures, sometimes in the woods, at other times in the water, where they plunge up to their heads. As a protection against mosquitos a large smoldering fire is made before the door as soon as evening comes. I have often seen rings of such fires made, and cows brought into the middle that people might milk them.”

1770 to 1785: RABIES - “HORN DISTEMPER” - “TAIL SICKNESS.”—About the year 1770 (2) there were some instances of rabies canina; happily but few dogs were affected, and few persons were bitten; their rage principally fell upon swine. In 1771, a mortal disease prevailed among foxes, and greatly reduced their numbers; about this time, or not long after, a distemper appeared among meat cattle, which destroyed many and has so to this day (1885). The distempers that befell these several kinds of animals were said not to have been known in the country before, more especially that which has affected meat cattle, and which has generally been considered as a new disease. It is commonly called the “horn distemper”, and cows are more especially subject to it; oxen but seldom; bulls are said to be exempt from it, also steers and heifers under three years of age. It is a disease that affects the internal substance of the horn, commonly called the pith, insensibly wastes it, and leaves the horn hollow. . . . (Meat cattle are subject to a disorder commonly called the “tail sickness”, which is a wasting of the bony substance of the tail, and if not cut off or dilated as far as the defect reaches, often proves fatal; it often accompanies the horn distemper.) From the cows seized with this distemper in the space of a fortnight, a suspicion arose that the distemper was infectious; time, however, has shown that it is not so, at least in any great degree, for it frequently happens, that among cattle herding together one of them shall have the distemper and the others remain in a perfect state of health. The disease was cured by boring a hole in the base of the horn, opening its cavity and allowing the accumulated matter to escape. I am unable to find another instance of this peculiar malady occurring in a general manner in any other country.

1772: George Washington, in a letter dated May 21, 1772, wrote (6): “. . . the rot, or some other distemper among my sheep swept off near an hundred, in the space of a month, this spring for me.”

1775: DISAPPEARANCE OF OYSTERS AND LOBSTERS.—A bed of oysters perished in the harbor of wellfeet, on Cape Cod, twenty leagues from the south of Boston. These oysters had been in great plenty, and furnished the inhabitants with no small plenty of food; but in this year for some unknown cause, they sickened and perished, and have never grown since in the harbor. During this period also, the oysters on the shores of Connecticut were in an unhealthy state, and sometimes excited vomiting in those who ate them. It is remarkable also that in 1776 the

lobsters in the vicinity of New York Island all disappeared. This event has generally been ascribed to the firing of cannon in the summer of that year. It is more probable that they perished, or abandoned the ground, on account of the bad state of their element (4).

1779: At Philadelphia and Maryland rabies canina was very common (2).

1785: SERIOUS OUTBREAK OF RABIES.—In America canine madness began to rage and spread in all parts of the northern states. The gazettes of 1785 abound with accounts of the dreadful effects of this singular disease which belongs to every pestilential period. Whenever the human race are generally afflicted with epidemics, the canine species rarely escapes the effects of the general principle; and not unfrequently foxes, wolves and other wild animals, experience its malignant effect and run mad. Almost every gazette announced some new case of hydrophobia (4).

1786: Hydrophobia continued to prevail this year (4).

1789: RABIES - DEATH OF HORSES.—Hydrophobia showed itself in America early in 1789. A man in New York State died of that dreadful malady, taken as was supposed, by skinning a cow that died of the disorder. In Maryland the autumn was distinguished by an unexampled mortality among horses (4).

1796: GREAT DEATH OF FOWL.—A great death among fowls and geese occurred in America; death was very rapid (2).

DEATH OF CATTLE - APPARENTLY TEXAS FEVER.—James Mease, a prominent Philadelphia physician, relates the following concerning a disease of cattle in Pennsylvania caused by southern cattle (7):

“in the month of August, 1796 . . . at Anderson’s ferry on the Susquehanna (Pennsylvania), I found the people of the house in great concern on account of the death of some of the cattle, and sickness of others, which had occurred in few days after a drove from the south had left the place. Upon inquiry I am informed, they communicated disease to the stock with which they mixed. The admission of a single head was enough to give rise to it. As the drove of cattle exhibited no marks of illness, the mystery of the cause was inexplicable, and is so to this day . . .”

1797: GREAT DEATH OF CATS (2).—Shortly before the commencement of the yellow fever in 1798, there was a great disease among the rats and cats, from which many hundreds died. This was also the case in Philadelphia, before the breaking out of yellow fever in 1797, and in 1796 at New York. . . . The animal usually lost its appetite, but drank a great deal, slept much, looked very ill, and many began to grow emaciated. Some died in a kind of a stupor; others on the contrary towards the termination of the disease became mad, vomited and foamed at the mouth. . . . It was calculated that five thousand cats perished in Philadelphia, and four thousand in New York, and in the course of the summer and autumn, it spread wide destruction among those animals over the northern states.

A FATAL DISEASE OF CATTLE (APPARENTLY BLACKLEG) (93).—The Rev. Elijah Parsons, of Connecticut, in a letter dated East-Haddam, October 17, 1797, related as follows:

“ . . . I have made particular inquiry of several intelligent farmers concerning the disease which has, for ten or twelve years past, been so destructive in this vicinity”

It has rarely destroyed cattle so old as three years. In some instances, however, it has been mortal to cows, but never it seems to oxen. It has been most fatal to calves in autumn, and to yearlings in May and June. Some have died

even in winter. The stock in point of quality, most liable to the ranges of this distemper, are the largest, most thrifty, and highest fleshed.

The symptoms of the mortification (for this is the vulgar name of the disease) are these: The infected creature is found listless, unwilling to move, and commonly lying down, which an hour before was feeding, and to appearance well. A small spot, which may be covered with a man's hand, is found swollen, and soft in the leg, shoulder, flank, side, but more often in the back, in the region of the kidneys. In the course of six, twelve, or twenty-four hours, life terminates with little expression of pain.

... The stench immediately after death is intolerable. The very hide is often left to rot with the carcass. Upon skinning the swollen spot is found to contain a jelly and black blood. A tanner has informed me, that "the hide which covered the mortified spot is often rotten, and that he has a number every year, which, after dressing, have a hole of the same dimensions with the swelling." . . .

Accordingly - the remedies which have been applied are chiefly of the preventive kind One person, however, has imagined that he has affected a cure in one or two instances, when the disease was taken in its first symptoms. After copiously bleeding in the neck, he informed me, that he gave the animal his own blood to drink, which operated cathartically, and then made an incision in the swollen spot, took out the jelly and gore, filled the cavity with rum and salt, after which the recovery was gradual. In all other instances, which were not numerous, he informed me, that this remedy had done neither good nor hurt. . . .

RABIES IN CONNECTICUT (93).—Some time in August last, the town of New-Hartford, Connecticut, was alarmed by the sudden appearance of hydrophobia, or canine madness, among the dogs of that place. Several persons were said to have been bitten by dogs supposed to be mad. The alarm which this occasioned was so considerable as to induce the magistrates of the town to exert the authority vested in them, by a law of the State, for the confinement of all dogs. . . . Shortly after the rabies appeared among the dogs of Suffield, another town of Connecticut. . . .

SINGULAR DISEASE OF GEESE (93).—We are assured also, that geese, in some of the eastern states, have been evidently affected in a singular manner. Many have been seen to seize some object with their bills, and to adhere to it till they died. . . .

A DISORDER AMONG FOXES (93).—We learn that the foxes, in some parts of Massachusetts and New Hampshire, have been affected with a disorder, the winter past, which rendered them an easy prey to the hunter. . . .

1799: GAPE WORM FIRST REPORTED IN AMERICA.—In a letter dated May 21, 1799, Andrew Wiesenthal, professor of anatomy at Baltimore, Maryland, wrote as follows (8): "There is a disease prevalent among the gallinaceous poultry in this country, called the 'gaps', which destroys eight-tenths of our fowls in many parts and takes place in the greatest degree among young turkeys and chickens bred upon old established farms. I know not whether the same kinds of fowls in England are liable to it, and therefore shall take the liberty to give you a brief account of it.

"Chicks and poult, in a few days after they are hatched, are frequently found to open their mouths wide and gasp for breath, at the same time frequently sneezing, and attempting to swallow. At first the affection is slight, but gradually becomes more and more oppressive, until it ultimately destroys. Very few recover; they languish, grow dispirited, droop, and die. It is generally known, that the symptoms are occasioned by worms in the trachea. I have seen the whole of it completely filled with these worms, and have been astonished at the animal being capable of respiration under such circumstances. . . .

"No effectual remedy is known against these most destructive animals. I have indeed seen them drawn out of the trachea, by means of a feather stripped from near its end which is passed into the larynx, and twisted round till it engages one or two of the worms, which are extracted with it."

Summary to 1800

Among the reports on animal diseases that occurred previous to 1800 the following seem to be particularly outstanding or significant.

1. Texas fever (Spanish staggers and distemper) was given considerable attention, with legislation being enacted in one state with a view of controlling the disease.
2. Severe and rather widespread outbreaks of rabies.
3. An exceptionally destructive plague among cats.
4. The gapeworm recognized as the cause of "gapes" in poultry.

It is amusing to find that "horn distemper" and "tail sickness", two rather fabulous diseases, were described at an early date. Belief in the existence of these so-called diseases has prevailed even somewhat to the present day in the face of persistent refutation by learned individuals.

PART II—PERIOD FROM 1800 TO 1866

This is a period (1800-1866) during which interest in agriculture and animal husbandry gradually increased until the United States Department of Agriculture was established in 1862. Within the many volumes of the agricultural journals, which are so characteristic of this period, may be found many interesting reports of outbreaks of disease among our domesticated animals. Beginning with 1866 the Department of Agriculture for the first time supplied statistics concerning the occurrence and prevalence of diseases among livestock.

1802: HOOF DISEASE FROM EATING HAY AFFECTED WITH ERGOT.—Chester County, Pennsylvania (9): A disease prevailed in this neighborhood amongst milk cattle particularly, but which also affected cattle and horses. You will perceive it to be analogous to the one supposed to be occasioned by ergot. . . . The cattle affected ate heartily, became daily more lean, manifested great uneasiness, occasioned most probably by a violent itching. Their hair in many places fell off, or was rubbed off by the animal in striving to scratch itself. After a time, one or both hind feet became sore, and the hoof loose, at which period some of the animals began to grow better. One lost its hoofs and part of its legs. Three cows lost both their hind feet, and others in the neighborhood were equally as bad. The legs began by drying, and growing much smaller from the hoofs to halfway between the fetlock and hock; at which point it appeared as if a string of twine were tied very tightly around the leg. Above this part the flesh was in perfect health; the lower part was hard, black and offensive. When the lower part became quite dry, little else than bone, it separated and fell off, after which the animal lived and ate heartily, hobbling along on the remaining stumps. They even began to grow fat. Their health seemed perfect. . . . The disease was never known but one season. The first symptom of it was observed in February and it reached its crisis the middle of May.

Orange County, New York, 1820: The disease prevailed to a great extent . . . and is well and minutely described by Dr. Arnell, corresponding secretary of the agricultural society of that county (Albany Plough Boy, Vol.3, p.44). The facts detailed by him leave no doubt of the death of numerous cattle in his vicinity, being caused by their eating hay, made from some grass affected with a species of ergot. . . .

1807: WORM IN THE HEAD OF SHEEP.—Flemington, New Jersey (10): The smallest size I have observed is less than a cheese skipper, about one inch up in the nose, creeping about in the mucilage; as they grow they creep further up, and when fully grown, they lie as high up as the cavities will admit. I suppose they are produced by a bee, that frequent the walks in sheep pastures, which resembles those bees, but of a less size, which pester horses in summer and deposit mites in their hair. I call them the sheep bee; but where they deposit their eggs I know not. They first begin to be troublesome about the time the honey bees swarm. I know of no cure. The method I follow to prevent the complaint, is to smear the noses, and up to the eyes of the sheep with tar. This practice seems to have a good effect upon sheep for about one month, and only three weeks in lambs, as they rub the tar off in sucking.

EPIDEMIC AMONG SWINE (11).—In the fall of 1807, a disorder broke out among the larger stock; it was not confined to my pens alone but it was an epidemic that raged among the swine throughout the country, and it progressed so rapidly among mine, that I expected at one time to have lost nearly the whole of them; the people of the neighborhood called the disease the sore-throat. . . . A hog would come up to the trough, eat, apparently be in good health, and in ten minutes after be dead. . . . I had several of them opened, but did not discover any particular cause for such a sudden exit, except a trifle swelling in the wind pipe, and black pustules on the tongue. . . .

1811: SALIVARY DEFUXIONS IN HORSES.—Wilmington, Delaware (12): The frequent occurrence of a profuse discharge of saliva from horses, and its rapid production of great emaciation in that animal, has not only excited the surprise and attention of many of the farmers; but had also give to many conjectures; by many it was imputed to be a peculiar quality inherent in the second growth of clover. . . . My friend Dr. Wm. Baldwin, of

Wilmington, informed me that ptyalism was caused by a species of *Euphorbia*. . . . I procured a small quantity of *E. maculata* and gave it to my horse enveloped in a small quantity of clover. . . . A preternatural discharge of saliva took place in less than half an hour. . . . Clover alone was fed with no such result. . . . I have always observed the *E. maculata* to abound in the fields where ptyalism was present.

1814: YELLOW WATER OF HORSES.—Pennsylvania (13) has to regret the death of many thousands of horses, by a disease which deserves no other name than by yellow fever. I allude to the “yellow water”, the symptoms and method of cure of which are totally different from the jaundice, yellows, or yellow water of Europe. This disease, I have reason to believe, is peculiar to North America.

EPIDEMIC SORE THROAT AMONG HORSES.—Near Philadelphia, Pennsylvania (14): An inflammatory disease has appeared among the horses of the neighborhood. . . . which is generally fatal. On the first appearance of the whooping cough among the human species, an inflammatory sore throat was epidemic among the horses throughout this country; attended with loss of appetite, fever, inflammation of the tonsils, and suppuration and very severe cough. . . . This disease has been generally called the throat distemper.

A SINGULAR AND FATAL COMPLAINT OF CATTLE (TEXAS FEVER).—In the states of South Carolina and Georgia (15), cattle brought from Europe, or from the interior, to the vicinity of the sea, are invariably attacked by a disease which is generally fatal. Cattle from the interior of the state of South Carolina, (but only a particular district,) so certainly disease all others with which they mix in their progress to the north, that I am told they are prohibited by the people of Virginia from passing through the state. A singular fact attending the disease is, that the cattle alluded to, have the power of infecting others with which they associate, while they themselves are in perfect health; this I (Dr. James Mease of Philadelphia.) can assert from my own personal observation, in the year 1796. . . .

I was told by an intelligent drover, that it is the cattle from the district of the long-leaved pine, that possess the power of diseasing other cattle. The species is the *Pinus Australis* of Michaux, *Pinus Palustris* of Linneus, the pitch pine, yellow pine, red pine, or broom pine. According to Michaux, the country occupied by this pine commences near Norfolk, and continues in a south-west direction for 250 leagues in length, and 40 to 50 in breadth. . . . The case of the South Carolina cattle is however peculiar. We do not find that those from other states produce a similar complaint, or any other, when mixed with the stock of Pennsylvania. The fatal disease alluded to, that occurred in 1796, in one instance, at Columbia, on the Susquehanna, attacked stock which had merely strolled about or had lain down in a plowed field, in which the South Carolina cattle had been previously penned for one night; a full proof of the virulence of the effluvia left by them on the ground. . . .

1819: BLOODY MURRAIN OF CATTLE - EVIDENTLY TEXAS FEVER.—In the year 1819 (16) the bloody murrain prevailed to a considerable extent in Chester County, Pennsylvania. . . . there can be no doubt of its existence before that year. The truth is, that it sometimes appears as an epidemic, and that cattle in some parts of the United States are particularly disposed to it, particularly in South Carolina, and certain districts of Virginia. . . . Mr. Jones of Gloucester, advised me to use a drench of the infusion of cedar berries. In nearly every case the effect was almost instantaneous; a considerable discharge from the bladder and bowels followed, and in five or ten minutes time a disposition to eat was shown on the part of the animal. . . .

A “CURE” FOR HYDROPHOBIA.—The accomplished editor of the New York Evening Post collected and made public numerous cases, to show the efficacy of the skull cap for curing the bite of mad dogs (17).

In 1821 Dr. Barton, in the Philadelphia Medical Journal, pronounced *Scutellaria lateriflora* or skull cap as wholly inert and consequently medically worthless.

BURNT TONGUE DISEASE OF CATTLE.—We learn that the disease called the burnt tongue, has made its appearance among the cattle in some parts of Baltimore County, Maryland (18).

BURNT TONGUE DISEASE OF HORSES.—Near Frankfort, Kentucky (19): Have you in your country the dreadful malady which affects the horses in this State, and in the State of Ohio as far as I can learn, and which, in many places, has been extended to the cattle and hogs? I mean the sore tongue. It commences with white blisters on the tongue, becoming raw in a few hours, and extends to the mouth and lips, a great deal of saliva is discharged - the horse if not relieved becomes incapable of eating - the tongue rots off and death ensues. It is attended with fever and costiveness. It is generally believed to be contagious, although it is admitted that some horses have not taken the complaint that have been fed with those that had it, and many have taken it that never have been so exposed. It is considered completely within the power of ordinary remedies if applied in time. . . . The disease was in the State of Tennessee in 1801-02. I was travelling and my horse had it, but it was not as general nor as virulent in its symptoms as this year. I then heard of no fatal cases.

1821: VACCINATION FOR CANINE DISTEMPER.—It is stated (20) that vaccination inoculation prevents what is called 'the distemper', so fatal to the canine race. I which those that make the experiment, and find it fail, would impart their ill success, to be inserted in your useful paper. . . . My sportive barking puppies, which have been vaccinated, seemed to urge me to mention this to you, that his brethren might not incur the distemper. (The vaccine referred to was the cow-pox vaccine, recommended by Jenner as a preventive against canine distemper.)

1822: BIG HEAD DISEASE OF HORSES (OSTEOPOROSIS).—Milledgreville, Georgia (21): Information is wanting regarding a disease of horses known in this part of the country by the term big head. This disease commences with swellings apparently of the bones of the face, on each cheek, a few inches below the eyes, attended with a slight bluish mucous from the nose.

1823: SALIVATION IN HORSES.—Baltimore, Maryland: This subject really demands the fullest investigation. Is it not an evil of comparatively recent date? Is it not aggravated by wet weather, when vegetation is more luxuriant? Why is it produced by a second crop of clover hay and not the first? Do not meat cattle and other ruminating animals suffer with it, although the effect is not exhibited by salivation, as in the case of horses? - J. S. S. Skinner, editor American Farmer (22).

RUBBING DISORDER OF CATTLE (MAD ITCH).—Tabot County, Pennsylvania (23): A dreadful malady appeared among the cattle on two different farms. The animals are seized with a muscular or nervous catching that resembles the hic-coughs, when the complaint seizes them in the head which it usually does, but some have been affected behind, some in one leg, some in the chest, and some across the loins - the catching increases - the part affected is hot and appears to itch so violently, that they soon rub all the hair off and lacerate the flesh - they appear to have high fever; take to the water; and can be with difficulty kept out of the creeks. They appear costive and die in 24 to 36 hours.

Ohio (24): About the tenth of September, 1813, an observing farmer noticed in one of his cows, an unusual propensity for rubbing her nose, and side of her head against every hard substance that came within reach. . . . So far as I hear in every instance it has proved fatal. . . . This disease was not confined to this farm alone, but attacked several other cattle in the neighborhood. . . . The disease appears to be in some measure contagious as there is one instance of a dog being attacked, who was known to have eaten a cow recently dead with the complaint. In a few hours after he gave notice of his illness by his howling and continual rubbing of his head . . . in a few hours the dog died.

Franklin, Missouri (25): . . . it is very similar, if not the same, which I have occasionally witnessed the ravages of amongst cattle of Tennessee, some 8 to 10 years past. . . . In the State of Tennessee, it was usually denominated the rubbing distemper, because the cattle when attacked, would rub their heads and necks against the trees and other firm objects, until their horns would sometimes drop off, or their eyes be rubbed out of their heads—sometimes the cattle would die before carried to such heights by the itching of their skins. This distemper is not contagious, I believe, though I have known 8 or 10 to die of it on one plantation, all nearly in the fall of the year. I have never

examined one of the victims after its death, but have been told by those who have suffered loss considerably by this malady, that upon dissection, the contents of the paunch are found to be as dry as ashes. . . . - December, 1923.

1824: A DISEASE AMONG CATTLE AND THE HUMAN SPECIES (ANTHRAX).—Bardstown, Kentucky (26): This disease first made its appearance among the cattle of this neighborhood during the summer of 1819, and its fatality was so great that horses, cows and sheep were alike victims of its fury. Cattle brought to the fold in the morning apparently in good health died before noon; and many that had taken their accustomed food in the evening were found dead in the morning; nay, those grazing in the fields but half an hour before, were seen writhing under the pangs of death, and dying in a few minutes. Death in such cases was often attended with violent agitations, and manifestations of the most agonizing distress.

The external signs of the disease, were an intumescence, sometimes originating in the throat, but generally commencing at the breast and extending along the sides of the flanks, and uniting across the lumbar regions. These swellings were soft and elastic resembling inflations, and upon post mortem examination, were found to contain extravasations of grumous blood, and effusions of coagulable lymph, and were of a dark and gangrenous appearance. The blood in some instances was so dissolved that it transuded through the pores of the skin. . . .

In the human subject, this disease, or at least one which was derived from it, commenced in a small and circumscribed vesicle, containing a dark and turbid fluid. . . . This gangrenous spot became encompassed in the course of its progress with a hard swelling of very great extent with a peculiar torpidity and loss of sensorial power in the part. Almost simultaneously the entire system became more or less deranged, exhibiting a complex train of phenomena . . . no one was affected who had not previously been engaged in flaying or otherwise handling the carcass of an animal that died of the disease described. . . . - J. Kercheval, M.D.

1824: BIG DISEASE OF HORSES (OSTEOPOROSIS).—Lincoln, North Carolina (27): About twelve or fourteen years since it was very prevalent in this part of the country, but is now rarely heard of . . . I have examined the skeletons of several horses which have died of this disorder. The bones of the head, particularly of the jaws, were hewed up and distended. The surface of the bone, with regard to its solidity and consistence, exhibited a natural appearance, but when broken up the inner part was distended and uncompact, and resembled a dry honey comb or pumice stone. . . . Some of the bones in other parts of the system appeared likewise to be affected. Those of the fore and hind legs were perceptibly vitiated, and some of the joints of the back bone exhibited like appearances

1825: HOOF DISEASE OF CATTLE (28).—A disease has made its appearance among the horned cattle in our neighborhood, which threatens us with very serious inconvenience. We are first apprised of its existence by finding the animal lame, and upon examination find the membranes or fleshy part, in the division of the hoof, sore entirely through The disease appears to be contagious. - American Farmer; Baltimore, Maryland; July, 1825.

1826: DEATH OF HORSES DUE TO GNATS.—Shelby County, Tennessee (29): A strange fatality existed among horses about the middle of last month. About 40 horses died within 24 hours, supposed to be occasioned by the buffalo gnat, a small fly, which continues about three days. They get into the nostrils, ears and sheath of the horse, and produce an inflammation which takes off the horse in a few hours.

DREADFUL MORTALITY AMONGST HORSES.—. . . their tongues are so dreadfully ulcerated that the power to manage their feed is entirely lost. The appetite is good - they seize with greediness every article of food which comes in their way, but soon drop it . . . the respiration is natural and the head free from disease, and indeed with the exception of costiveness, there is no symptom of disease independent of the tongue. Of this member the whole papillary surface on the outer half is sloughed

1827: PECULIAR DISEASE OF CATTLE.—Currituck County, Virginia (30): Our cattle are afflicted with a peculiar disease called the shoulder brake, which proves fatal to many of them. . . . The range is excellent for cattle, but within a few years, we have suffered much from the disease. Without any previous symptoms of disease our cattle are suddenly deprived of the use of one and sometimes both their shoulders; and on examination the shoulder blade is found to be broken about the middle. . . .

1828: INDIAN CURE FOR HYDROPHOBIA.—Some time ago I addressed, by direction of the Secretary of War, a circular to our agents in the Indian country, with directions to ascertain the Indian's remedy against the effects of bites from mad dogs and snakes. . . .(31).

The cause of delay of this letter is owing to the Indians having been drunk almost ever since my return from Canandaigua. By calling there five or six times I found them sober last night sometime after dark, and received the following from them:

The cure for hydrophobia is a plant resembling the tobacco plant . . . when ripe the leaves are tied in bunches and put under cover to dry. When a dog is afflicted, it is moistened and tied around his neck, and the dry tobacco put into a pipe and smoked by a person into his nostrils; and in case a person is bitten, he is to be treated in the same manner, excepting binding moistened tobacco to the wound

1830: VACCINATION FOR CANINE DISTEMPER.—About six years ago (32), I was induced by a medical gentleman, to try the effect of vaccination upon three dogs, which I placed by themselves for the purpose of giving every chance. To my great astonishment and delight the three dogs took the cow pox effectually, and never had the distemper afterwards, although I placed the experiment so far as to place them in the hospital, where nine hound dogs were suffering with that disorder. I need not say that after my experiment answered so satisfactory, I have continued ever since to vaccinate the young dogs; and though I must admit that some of them have had the distemper after vaccination, it has attacked them in a very mild degree, and they have in nearly every case recovered. . . .

1830: MORE ABOUT BIG HEAD DISEASE OF HORSES.—Baltimore, Maryland (33): We regret that it is not in our power to say anything satisfactory with regard either to the nature or the treatment of this disease. It appears to be peculiar to this country; as, by reference to the English and French farriery books we find nothing stated in them analogous to it. Our inquiries from several professional veterinary surgeons in our city have been equally unsatisfactory. In one case we learn from Dr. Haslam, that by checking it in its incipient stages, the animal has been cured by administering stramonium We are told that the disease is very common in the western portion of our country. -J. S. S. Skinner, editor American Farmer.

Buncombe County, North Carolina: The American Farmer for 1833 (34) recorded the following: "Many persons here allow their horses to die from the belief that the disease is incurable. Others are in the habit of burning the head with a hot iron, so as to produce a large sore, and when deep enough to perforate the outer bone, frequently perform a cure. The cure in my hands consists in the removal of the outer table of bone, over the most prominent part of the enlargement, and establish a drain for it

1831: ALARMING MORTALITY AMONG HORSES.—Massachusetts (35): An alarming mortality has taken place among the horses. This disease which is thus fatal, is described as commencing with a continual inclination of the head to the right, and a subsequent propensity to turn around on the heels until the animal dies: it is termed apoplexy

(Note: The above described disease is probably the equine encephalomyelitis of the present day.)

1833: THE MILK SICKNESS OR TREMBLES.—Vincennes, Indiana (36): At Longsport, on the banks of the Wabash, I was cautioned by an elderly lady against using either milk, butter, or beef on my way to Vincennes. As a reason for her caution she informed me that the milk sickness was common in this state. She informed me that many deaths occurred annually by this dreadful malady. There is a difference of opinion as to the cause that produces it; but the general opinion is that it is occasioned by the yellow oxide of arsenic, in the low ground and woodland, and particularly near the Wabash River, and that some weed, as yet unknown, imbibes the poison, and when eaten by cattle causes them to quiver, stagger and die in a few hours. If cows eat of it the milk is poisoned, or butter that is made from the milk; and is also as sure death to those who use the milk and butter as it is to the animal that eats the weed. Great care is taken to bury such cattle as die with it; for if dogs, etc. eat their flesh, they share the same fate, and it operates upon them as violently and fatally as upon the creature that was first affected with it. The butchers uniformly in this state runs the victim for his knife a mile, to heat its blood, and if it has eaten of the weed, it will at once on stopping, quiver and shake, and if it does not, it is occasioned safe to butcher; and this is the uniform test, even when cattle show no signs of having eaten the weed. Indiana is not alone in this misfortune: there has been many cases in some parts of Ohio and south of St. Louis, and other parts of the southwestern states. I have seen many farms with comfortable buildings and improvements, entirely abandoned, and their owners fled to other quarters, to avoid the dreadful curse. And yet I confess I have never seen any section of the country superior in soil to the land adjoining the Wabash, and this is my only objection to it.

TUMOR ON THE JAW OF CATTLE (ACTINOMYCOSIS).—We have published several communications relative to a disease in cattle sometimes called a hold-fast, a tumor on the jaw, which is believed to be incurable There is in each cheek bone of the ox a large irregular cavity The fleshy tumor was over this cavity, which I dissected off, and was as large as a mans two hands placed together. This tumor appeared to have commenced upon the exterior bone of the cavity, and was very firmly and intimately connected with it. It consisted of what we call schirrous or indurated flesh and near the same such bone was perhaps a gill of pus. The bone itself was considerably absorbed, that it had lost its consistence as bone, so that I could push my dissecting knife through it. . . . - American Farmer, Baltimore, Maryland (37).

SUDDEN DEATH AMONG CATTLE AND HORSES - PROBABLY ANTHRAX.—Near Philadelphia, Pennsylvania (38): A disease is prevalent among the horned cattle and horses in the neighborhood of Frankford, in this country Within the last fortnight or three weeks, upwards of nine cows and six or seven horses have died in the immediate vicinity of the village, and all, so far as I can learn, were carried off in the same way. My cows and horses were apparently in good health three hours previous to death: and in every instance they were found dead without exhibiting any symptoms of disease. I am told however, that a horse of one of my neighbors exhibited uneasiness and a kind of vertigo a few hours previous to death, but that no symptoms of disease were visible in the morning, the animal having died in the evening

Baton Rouge, Louisiana (39): A disease very destructive to cattle, horses and hogs is now prevailing in lower part of Baton Rouge, and the adjoining part of Livingston. It first appears by swellings which are not confined to any particular part, but generally under the joints of the head and neck, and between the fore legs. In many cases the animal dies as soon as the swelling appears. Some live 24 hours longer The swelled parts one being opened, before or after the animal is dead, discharge a slimy, yellowish fluid. In some cases the discharge is white

EARLIEST MENTION OF HOG CHOLERA.—Muskingum County, Indiana (40): Hog cholera was first known in this county in 1833. Some few died on the Muskingum River from May to December. Its appearance was again made in 1842; also in 1849-50 to 1855. At no time was it so bad as on the Wabash River, Indiana, in 1830 to 1833, and 1840 to 1845.

1835: DREADFUL MORTALITY AMONG HORSES.—Somerset County, Maryland: Between 60 and 70 horses have recently died, of what is called the blind staggers. The disease is one that requires prompt and vigorous treatment (41).

1839: MAD ITCH DISEASE OF CATTLE.—Washington County, Iowa (42): There is a complaint raging among the cattle of this county called the mad itch, which appears to be incurable It takes the cattle with an itching on the nose or around the horns, they then commence rubbing and throwing their heads and frothing at the mouth, and in about 24 hours they are dead.

1841: DISEASED JAWS IN CATTLE (ACTINOMYCOSIS).—Chester County Pennsylvania: Do you or any of your correspondents know the cause or remedy for the swelling or lump on the jaw, often found on cattle, proceeding, in the first place from a mere point, just below the eye, and growing so finally to impede the motion of the jaws? In a large drove of stock cattle, may be found several with this lump just appearing, and so certainly is it regarded here in this grazing district, as a fatal indication, that such cattle are sold for a mere song. The lump sometimes shows itself on the lower and sometimes the upper jaw, and on handling seems hard and fast like bone. On dissection it is said to resemble a honeycomb. They occasionally break and discharge matter, to the great injury of the animals condition. I have never known of one being cured. (43)

1843: ABORTION OF COWS (APPARENTLY INFECTIOUS ABORTION).—Near Philadelphia, Pennsylvania (44): There have been many complaints among our farmers, during the present as well as the past winter, on account of the frequent occurrence of abortion among their cows. We are greatly at a loss to trace the evil to any known cause This disease, if it may be called so, is one of no trifling annoyance; and is perhaps one of the greatest to which the dairyman is exposed. It deserves and requires the closest attention of experienced practical men. We have this winter, heard from some farmers in the vicinity of Philadelphia, who have lost eight or ten calves, that have come to premature birth.

MORE ABOUT MAD ITCH OF CATTLE.—Indiana (45): This is the name given in the western states, where it most prevails, to a disease of cattle, commencing with apparently spasmotic motions of jerking of the head, and itching around the nose and base of the horns. They will lick their sides and back, rub their heads, and the jerk or hiccough inflates them with wind almost to bursting. This symptom is not always present. As the itching increases, the animal rubs more furiously, froths at the mouth, and finally from 12 to 24 hours dies raving mad the cause of this formidable disease . . . is unknown.

1846: THE “DENGUE” DISEASE OF HORSES.—St. Louis, Missouri (46): This is the name of a disease at present sadly prevalent among horses. We are informed by a livery stable keeper that on one night last week sixteen of his horses were taken with it, and in other stables many horses were afflicted with the same disorder. It makes its attack suddenly, the eyes swelling and the whole system taking on an inflammatory condition It is a rapidly fatal disorder.

SINGULAR AND FATAL DISTEMPER AMONG HORSES (EQUINE ENCEPHALOMYELITIS).—New York City (47): We have seen many accounts of a very singular and fatal distemper among the horses on Long Island, Staten Island and some parts of New England. The following account of the disease is taken from the New York Spirit of the Times: “Many of our readers will be surprised to learn that upon Long Island, within ten miles of the Union Course, not less than 300 horses have died within three weeks The disease makes its appearance in different forms; in some cases it commences by the horses refusing his food and hanging down his head: after a short time he becomes stupid and leans to the side of the stable for support, or if out at grass against a tree or fence - after remaining there a few hours he falls, and in the course of a day or two expires apparently exhausted. In others it commences by an apparent weakness across the loins, and stiffness of the limbs, which gradually increases until the poor animal falls, in most cases never to rise again. In the latter case the brain is not visibly affected, and the horse will take both food and drink almost to the period of his decease A similar epidemic prevailed on the same ground in the fall of 1828, which was equally fatal. Many farmers lost 20 to 30 animals

TRICHINAE OF SWINE FIRST REPORTED IN AMERICA.—The *Trichina spiralis* was first detected in swine by Joseph Leidy, M.D., of Philadelphia. The report may be found in the Proceedings of the Academy of Natural Sciences of Philadelphia for October, 1846, as follows (48):

“Dr. Leidy stated that he had lately detected the existence of an Entozoon in the superficial part of the extensor muscle of the thigh of a hog. The Entozoon is a minute, coiled worm, contained in a cyst. The cysts are numerous, white, oval in shape, of a gritty nature, and between the 30th and 40 of an inch in length.

The Entozoon he supposes to be the *Trichina spiralis* heretofore considered as peculiar to the human species. He could perceive no distinction between it and the specimens of *T. spiralis* which he had met with in several human subjects in the dissecting rooms, where it had also been observed by others, since the attention of the scientific public had been directed to it by Mr. Hilton and Prof. Owen."

1850: SHIPPING FEVER OF HORSES.—The transportation of livestock by railroads has been latterly much adopted on the principal lines in this country The present season many horses destined for sale in New York and Boston, have been brought to Albany by railroad, from western New York. On reaching Albany, it has been common for them to tarry several days, in order to recruit and appear in the market in the best possible condition. Many of these horses, while stopping here have been attacked by inflammation of the lungs, which in many cases has terminated fatally. The disease has been so violent and rapid in its progress that death has ensued within twenty-four hours. We are informed that the frequent occurrence of this disease in horses brought by railroad, has been a discouragement to that mode of conveyance (49)

1854: GREAT DEATH OF CATTLE DUE TO TEXAS CATTLE (TEXAS FEVER).—During 1854 a large drove of Texas cattle were driven up into Illinois and sold at a handsome profit (50). News of the success of this venture spread among the cattle growers of northern Texas, and the following season many of them duplicated the project. An unforeseen difficulty exploded the whole business within the next two years. It was found that the southern or Spanish cattle were subject to an epidemic or contagious disease somewhat resembling the yellow fever of the human race, and so contagious did it prove that all along the track those cattle were driven the farmers lost large numbers of their cattle from that disease, many losing almost their entire stock within a few days. So serious was the loss occasioned by each drove of Texas cattle passing through, that the inhabitants of southwestern Missouri held conventions in divers places, and resolved that no more Texas cattle should pass through the country, and by order of these conventions, armed bands of patrols were appointed, whose duty it was to turn back all Texas droves that might attempt to pass, which they did effectually. Thus ended what was at one time a promising trade.

1856: EPIDEMIC AMONG THE HORSES OF FORT RANDALL (51).—On the tenth of August, 1856, four companies of the second dragoons arrived at Fort Randall, in Nebraska About the 20th of August a disease broke out simultaneously in all four companies, and many horses died over a period of weeks and months. Public animals, private stock of officers, a few mules and Indian ponies were alike affected. The acclimated suffered equally with the unacclimated. The symptoms were, a running of the nose, swelling of the throat and jaw, a tenderness of the feet, followed by suppuration at the point where the hoof joins the skin, and exungulation. Also a loss of mane and tail, but the appetite remaining uniformly good. No treatment was effectual or afforded relief. There were no veterinary surgeons in the service, and consequently when these noble animals became seriously sick, they most invariably died.

1857: HOG CHOLERA IN THE OHIO VALLEY.—A fatal malady has prevailed among hogs in the Ohio Valley during the last six months (52). It is computed that between 60,000 and 70,000 have fallen victims to the destructive distemper within a circumference of 100 miles surrounding Cincinnati. The disease is considered incurable, having baffled the most critical investigation into its nature, and as steadily resisted all remedial agents. The malady has been vaguely denominated "cholera", from the failure to discover its true character, and upon that principle which a few years ago prompted mankind to apply the same term to all ills which resemble cholera in the human body and which they did not comprehend. . . .

MURRAIN IN CANADA.—Quebec (53): An alarming disease prevailed among cattle in the parishes of La Beauce, on the South side of the St. Lawrence, the origin of which cannot be traced. Upwards of 1,500 animals, chiefly cows, have perished.

1858: CONTAGIOUS PLEURO-PNEUMONIA INVADES AMERICA.—The contagious pleuro-pneumonia or lung plague, according to James Law (54) was introduced from Europe to Long Island in 1843, to New Jersey in 1847, the Cape of Good Hope in 1854, and to Massachusetts in 1859. By 1858 the disease was the cause of considerable alarm in New York City.

It was introduced into Brooklyn, Long Island, in 1843, in the system of a ship cow, purchased by Peter Dunn from the captain of an English vessel. From Dunn's herd it spread to others adjacent and speedily infected the whole west end of the Island. In 1858, Frank Leslie (55), by means of his "Illustrated Newspaper", caused such agitation "regarding the unhealthy condition of the swill stables and the cows kept in them, and the poisonous properties of the milk derived from such sources." He charged that from eight to ten thousand children died annually in the city of New York due to the "deliterious and poisonous qualities of swill milk." Committees were appointed by the board of health, to "investigate the character and condition of the sources from which cow's milk is derived for sale in the city of New York." The majority committee reported that "sores or wounds were observed upon the tails of several of them, just above the bush of the tail", and the committee was informed "that these sores were produced by the inoculation, which is practiced extensively in order to prevent the contraction of a disease that is said to prevail epidemically among the cows of this city and in the surrounding country."

"The inoculation consists in the insertion in the tails of the living animals, as the virus, matter from the lungs of a cow which had died of the disease. The cows are inoculated when first brought into the stables, and it generally requires two or three weeks to heal, and sometimes it is thought better to cut the tail off. This is one of the reasons why short tailed cows were found in the stables Your Committee would state that all the testimony which they have been able to obtained upon that point fails to demonstrate a single instance where a child or adult has sickened or died from the effects produced by drinking swill milk (55)."

The plague was introduced into Massachusetts on July 23th, 1859, in the bodies of four Dutch cows imported by Winthrop W. Chenery, of Belmont, near Boston (54). The disease soon spread far and wide, and many valuable herds were decimated. Great alarm was felt, not only in the New England and Middle Atlantic States, but throughout the West (56). A special session of the legislature of Massachusetts was called, and \$1,000,000 appropriated for the employment of measures calculated to arrest the spread of the disease. The most important of which was in brief as follows: cattle which are infected or which have been exposed to infection, shall be enclosed in a suitable place and kept isolated; the expense of their maintenance to be defrayed one-fifth by the town and four-fifths by the State. The cattle may be killed at the discretion of the constituted authorities, and their value paid to the owners. The same authorities may also prohibit the departure of cattle from any enclosure, and also exclude cattle therefrom. They can also prohibit the passage of cattle through the town or city, or of bringing them into it. All the cattle that are diseased or have been exposed to the infection, to be marked on the rump with the letter P; and no animals so branded shall be sold or disposed of without the consent of the authorities. All who know or have reason to suspect, of the existence of the disease among their cattle must give notice of the fact to the authorities.

In addition to the local authorities, three persons are appointed as commissioners, to examine into the nature of the disease, to attend the hospitals or quarantine stations, and to make a report of them to the governor and the council. These measures were eminently successful; the disease was speedily arrested and not more than 500 animals died of the disease. In addition to this 657 animals that had been exposed to contagion were killed that were found to be diseased. One fact seems to be clearly established, that the disease is contagious, and the only preventive is to isolate the affected cattle (56).

1865: GLANDERED HORSES FROM THE ARMY (57).—Many warnings to the public were published in the American Agriculturist for 1865 revealing the danger of getting glandered horses from the army. Glanders disease was supposed to be "fearfully prevalent in some of the Government horse hospitals." The unservicable horses were sold to the public resulting in the disease being "spread most alarmingly." After the Civil War glanders was reported as being very prevalent in the Southern States, and was described as a "legacy left by the war." (58)

Summary of the Period from 1800 to 1866

While the majority of the reports of animal diseases that occurred during this period were the result of observations by the laity, and usually of a non-scientific nature, many of them nevertheless are important by virtue of their priority and general interest. The most important or otherwise interesting reports may be summarized as follows:

1. First mention and description of ergotism of cattle (1802).
2. Lumpy jaw (actinomycosis) of cattle was reported (1833 and 1841) on more than one occasion, being known as a "hold fast" or "tumor on the jaw" and "swelling or lump on the jaw."
3. Abortion of cows, apparently infectious abortion, reported from Pennsylvania (1843).
4. Cattle from Texas reported as causing a great loss to the stock of other states "all along the track" on being driven to Chicago (1854). Heretofore reports attributed Texas fever (under the name of Spanish fever, murrain and distemper) to cattle from an area southeastern United States.
5. Mad itch of cattle, a fatal disease, reported from many states (Pennsylvania, 1823; Missouri, 1823; Iowa, 1839; and, Indiana, 1843).
6. Several outbreaks of anthrax among domesticated animals with its transmission to man during one outbreak (1824, 1833).
7. Big head disease of horses reported and described on many occasions (1822, 1824, 1830, and 1833).
8. A fatal disease of horses (probably the equine encephalomyelitis of the present day) was reported on several occasions (Massachusetts, 1831; Maryland, 1835; New York, New England and St. Louis in 1846).
9. The first mention of fatality among horses due to gnats. Gnats occasionally caused great havoc among the horses of certain parts of the Mississippi Valley area, especially during the latter half of the 19th century, and have even been the cause of losses during recent years.
10. Hog cholera first occurred during this period (1830 to 1833) along the Wabash River in Indiana.
11. Trichinae of swine first detected by Dr. Joseph Leidy of Philadelphia (1846).
12. Jenner's cow-pox vaccine used as a preventive for canine distemper (1821, 1830).
13. Lung plague or contagious pleuro-pneumonia of cattle introduced during this period (1843) and by 1858-59 had spread over northeastern United States causing considerable alarm. Steps taken to eradicate the disease from Massachusetts were successful.

PART III—PERIOD FROM 1866 TO 1884

During this period better and faster means of transportation were being developed, the growing cities were demanding in greater quantities and products of the farm lands, the meat packing industry was forming, and interest in animal husbandry was increasing. These factors, together with a young and immature public appreciation of the veterinary sciences, contributed towards a situation that facilitated the transmission and unchecked spread of disease among livestock.

During 1866 reports of animal diseases attracted the attention of J. R. Dodge, statistician of the United States Department of Agriculture. By means of a wide correspondence and questionnaire, Dodge accumulated statistics which were published in the annual report of the Department for each year from 1866 until 1878, when veterinarians were employed by the Department to take over this phase of its work.

Dodge revealed that our livestock, in regard to health, were in a precarious condition. Plagues were rampant, spreading and growing more destructive each year. Thus as early as 1868 and 1870 demands were made by the Commissioner of Agriculture for the creation of a division of veterinary surgery at Washington, D. C. Again in 1878, the Commissioner of Agriculture urged the formation of a division of veterinary science. Although a small number of veterinarians were employed by the Department as early as 1878, it was not until 1884, when the situation became so critical as to demand the creation of a Bureau of Animal Industry in connection with the Department of Agriculture, with a veterinarian as its chief.

It is most unfortunate indeed that the American public, during this period, did not have sufficient understanding and foresight to better patronize the few noble efforts to develop the veterinary profession in America during this time, for much of the havoc and distress suffered by our livestock would have been avoided.

1866: TRICHINA IN AMERICAN PORT (59).—At this time the *Trichina spiralis* attracted much attention in America and Europe. A committee of the Chicago Academy of Natural Sciences examined the flesh of 1,394 hogs from the markets and packing houses and found that one in fifty was more or less infested. The committee stated that a heat of 150 degrees would destroy the parasite. It was the opinion of many at this time that *Trichina* did not exist in American pork.

HEALTH AND CONDITION OF LIVESTOCK.—The increasing magnitude of this prominent agricultural interest, and the rapid enhancement of values through judicious crossing and more liberal keeping and skillful management render important a careful investigation into the condition of farm stock in this country (58). The increase of disease from want of food and management, suggests the urgent necessity of examination into its character, causes and results. An interest involving a capital of fourteen hundred millions, without reference to lands, buildings, and incidentals, demand the watchful care of the public guardians of our national resources. - J. R. Dodge.

DISEASES OF CATTLE.—*Pleuro Pneumonia* (58): This disease is reported in Newport county, Rhode Island; in Kings county, New York; in Hudson county, New Jersey; and in Buck's county, Pennsylvania. In Baltimore county, Maryland, a prevailing disease is reported, which is called lung fever. It originated in the vicinity of Baltimore and has spread considerably.

Abortion: This disease has prevailed to some extent in the dairy districts of New York and in Washington county, Vermont; one or two cases in a herd of twenty cows is common, and in a few instances half of the herd have aborted.

Spanish Fever: The disease known in a certain belt of country by this appellation and sometimes as Texas fever, has proved exceedingly fatal, and has excited great apprehension in states in which it has ever raged; hot indignation of stock owners against Texan cattle drovers, who have been threatened with combined armed opposition, and compelled to desist from the prosecution of their trade.

The following places among others have been afflicted with the Spanish fever: Lynn county, *Kansas*—the disease was prevalent during the summer and fall; Butler county, *Kansas*—cases reported, 141; Osage county, *Kansas*—loss \$5,000, not one in twenty recovered; Leavenworth county, *Kansas*—four visitations in seven years have resulted from the arrival of Texan cattle in three or four weeks after their appearance; Woodson county, *Kansas*—some farmers lost all they had and no less than 30% of the cattle have died; Fort Scott, *Kansas*—the Spanish fever commenced in May and continued all summer and fatal to fully one-half of the native cattle in the county, while Texan cattle did not appear to suffer any ill effect from the disease; Cass county, *Missouri*—2% of the cattle in this county died of the disease; Christian county, *Missouri*—the disease was very fatal but did not spread; Newton county, *Missouri*—fever prevailed from July to October and many droves are stopped until fall, but no sign of disease appeared among Texan cattle; Chariton county, *Missouri*—loss about 60% and nearly all attacked died in a short time; Oldham county, *Kentucky*—the disease appeared in June, introduced by Texan cattle; Perry county, *Illinois*—the disease appeared in July among cattle pastured on ground previously occupied by Texan cattle.

Various Diseases: In Park county, *Colorado*, a disease known as *swelled brisket* has occasioned 20 to 30 deaths. In Barton county, *Georgia*, and Jackson and Emmet counties *Iowa*, losses from *black-leg* are common. *Bloody murrain* is prevalent in Harford county, *Maryland*, where fifteen cases and eleven deaths have occurred.

In many places diseases are spoken of under vague terms, “murrain” and “distemper.” In many cases reported, particularly in the South, these words are common. “Murrain” is prevalent in Barton county, *Georgia*, and Stokes and Lincoln counties, *North Carolina*. In Towns county, *Georgia*, it was reported that cattle pastured with cattle from the south take the murrain and invariably die, though those brought from the south do well, thus indicating the identity in these cases of murrain and Spanish fever. In Cadwell county, *North Carolina*, a disease among cattle known as “distemper” proves fatal in nearly all cases, while in some cases the words “murrain” or “distemper” are used.

DISEASES OF HORSES.—Horses have suffered comparatively little from disease during the past year (58). Very few cases of disease are reported from New England.

Glanders: In the middle states reports of glanders and lung fever are made from a few counties. In the South there is more complaint of glanders than elsewhere, every state having been afflicted by it - in some places with great severity - early last season. This disease seems to be a legacy left by the war but is now rapidly disappearing.

Loin Distemper: In Texas several counties have suffered from “loin distemper”, which does not affect geldings though both sexes are subject to it. (Writer’s note: The evidence given here indicates the disease may be dourine.)

Various Diseases: In Morris county, *New Jersey*, several horses died from a disease supposed to be *pleuro-pneumonia*. All the cases proved fatal. In Jefferson county, *New York*, a “*horse distemper*” is prevalent but not very fatal. A mortality estimated at one-third of the colts foaled this spring, in Azankee county, *Wisconsin*, is reported, this disease is attended with swelling of the joints.

In Grant county, *Wisconsin*, there have been instances of a disease of the eye. The *big-head* prevails among horses in Pulaski county, *Illinois*. In Clinton county, *Illinois*, about 200 horses have died of a new disease. The horse becomes very sick, with quick breath and pulse and cold extremities, followed by death in 24 hours. A loss of 87 horses from *big-head* is reported in the same county. In Miami county, *Ohio*, a fatal disease prevailed last year, but horses are now healthy.

In Van Buren county, *Michigan*, deaths have resulted from a disease attended with swellings of the legs, head and jaws, and with running sores. In Know county, *Kentucky*, a fatal disease has prevailed without any perceivable cause. *Lock-jaw* and *lung disease*, fatal in a few cases, are reported in Kent county, *Delaware*. In Henderson county, *Illinois*, many horses have died - thirty in Oquawka - from a disease which appeared to be contagious: it was supposed to have originated in pasture of new bottom land.

In Barton county, *Georgia*, several horses and 100 mules died from “blind-staggers.” There was a considerable loss of horses, mostly for want of corn, while in Taylor county, *Georgia*, and Yalabusha county, *Mississippi*, many horses died in consequence of feeding on “shipped” or “up country” corn, which had been damaged.

DISEASE OF SHEEP.—Sheep have suffered more from disease the past year than usual—more than cattle or horses, but less, probably, than hogs (58). The following illustrates the tenor of information:

Berkshire county, *Massachusetts*—one in every twenty have the foot-rot; Kent county, *Delaware*—rot exists in this county, and there have been a loss of young lambs from exposure; Lorain county, *Ohio*—heavy losses have resulted from rot, with the livers light colored and quite rotten; Nicollet county, *Minnesota*—6% died from the foot-rot; Polk county, *Tennessee*—rot has destroyed three-tenths of the sheep.

Forest county, Pennsylvania—a very destructive disease prevailed among sheep, whereby one-third died. The disease is not known, but it appears to be something like consumption. Niagara county, New York—grub in the head prevails; one flock lost 100; others 10 to 60. Lycoming county, Pennsylvania—two and one-half percent of our sheep died, attacked with a swelling under the jaw. They moped around four or five days and died. Collins county, Texas—two-thirds of the sheep of this county died of the scab or from exposure. Guthrie county, Iowa—the sheep of this county are dying off rapidly. The first symptoms noticed is a general weakness of the limbs, followed soon after by death, mostly among the rugged and robust sheep. After death the carcass is found full of small mattery white pimpls.

DISEASES OF HOGS (58).—Almost all diseases of swine seemed to be popularly resolved into “hog cholera (58).” Of all diseases of domestic animals, those of this genus are evidently less thoroughly understood than those of any other farm stock. Ideas on the subject are in a singular state of confusion, and remedies are countless in number and most incongruous in character. If the symptoms were actually noted, it would probably be found that several kinds of “hog cholera”—as every prevalent disease of the hog appears to be called—are uniting in the mischief produced.

An idea of the alarming aggregate of the losses may be gained by reference to a few of the items showing the proportion, value, or number of the stock, lost in separate counties. These, it is true, are selected from the worst cases as follows:-

Cambria county, Pennsylvania—16% died. Floyd county, Virginia—3/4 of the hogs died. Marion district, South Carolina—loss 20%. Cherokee county, North Carolina—1/3 died. Taylor county, Georgia—loss 20%. In some years 50%. Farmers have almost abandoned hog raising. Clay county, Alabama—one man, with a herd of 174 lost all but 18. East Feliciana Parish, Louisiana—lost 20%. Union county, Tennessee—700 died valued at \$5,600. Jefferson county, Iowa—loss 15%. Alexander county, Illinois—loss 50%. Clark county, Missouri—loss 50%. Kenton county, Kentucky—loss 4,000 to 5,000. In Kentucky the estimated loss in different counties range from 3 to 45%. Indianapolis, Indiana—20% of all the pigs produced in the last five years have perished from disease.

1868: DISEASES OF LIVESTOCK PROVOKE NATIONAL ATTENTION.—Horace Capron, Commissioner of Agriculture, 1867-1871, in his report for 1868, under the title “Disease of Farm Stock,” wrote (60):

“The prevalence of fatal maladies among all varieties of farm animals, resulting in the annual loss of not less than fifty million dollars demands the prompt attention of this department, the vigilance of the agricultural associations, and national and state legislation. The past year has not been one of peculiar misfortune in this respect, except in the dissemination of the splenic fever, communicated by Texas cattle; yet horses, mules, sheep and swine have all suffered from the local prevalence of malignant forms of disease, against which the veterinary skill is little opposed, and little more than empiricism and superstitious folly is practiced. A disease may suddenly decimate the cattle or horses of a neighborhood, the only popular knowledge of which is the statement that it is a murrain or distemper. A distemper exists locally in several of the Southern States, by which the loss of a plantation’s stock of horses and mules not infrequently occurs, with scarcely an effort or a hope for a cure. The annual losses in swine cannot be less than ten to fifteen million dollars by the disease known as “hog cholera,” for which no remedy has been found; and prevention has proved difficult and uncertain.”

He continued: The formation of veterinary colleges—not for the treatment of animals, but for the education of a class of practitioners of skill and science, who might become beacons, warning the proprietors of stock of the approach of disease, and pointing out the means of prevention—has been adopted in many European countries, from which much benefit to the community has been derived. I considered it eminently the duty of this department not only to point out the want of such an institution but to initiate its establishment; and I earnestly hope that Congress may authorize at an early day the creation of a division of veterinary surgery for the investigation and prevention of diseases of domestic animals, and for the advancement and diffusion of veterinary science and its most efficient and beneficial practical operation.”

Again in 1869, Capron wrote (60): “The numerous epizootic and zymotic diseases by which our cattle are infected demands the intelligent consideration of the general government and of the several states. . . . It would seem to be the duty of the government not only to direct the attention of the agricultural community to the want of care of stock and to the general ignorance of appropriate treatment, but also to encourage the establishment of institutions where veterinary medicine and hygiene may be taught in their widest application, and a class of practitioners be produced capable of solving the problem - how to preserve domestic animals in good health under

conditions not natural to the species. The conditions of the past few years has demonstrated the necessity of such facilities, and I therefore strongly recommend the establishment of a division of veterinary surgery in connection with this Department."

In 1870 Capron (61) again "called attention to the imperative necessity for establishing a division of veterinary surgery in this Department," he continued, "The value of stock lost annually from disease is enormous, and threatens not only to decimate our animals, but to expose the human family to disease from the consumption of unwholesome meats."

SPANISH FEVER OUTBREAK OF 1868.—The ravages of the Spanish or splenic fever were greater last season than ever before (62). The mode of transportation, by steam eastward from the frontier railway stations, and up the Mississippi in steamboat brought the contagion into the heart of the country and disseminated it from the Mississippi to the Atlantic. . . .

A loss of over 2,000 head was reported from Missouri with heavy losses also reported from Illinois, Indiana and Kansas; and a few cases in Ohio, New York, New Jersey, and Lancaster county, Pennsylvania. The following letter from Waverly, Missouri, well illustrates the feeling of the citizens of that State:

"Talk to a Missourian about moderation, when a drove of Texas cattle are coming and he will call you a fool, while he coolly loads his gun and joins his neighbors; and they intend no scare either. They mean to kill, do kill, and will keep on killing, until the drove takes the back track; and the drovers must be careful not to get between the cattle and the citizens either, unless they are bullet proof. No doubt this looks a good deal like border-ruffianism to you, but it is the way we keep clear of the Texas fever; and my word for it, Illinois will have to do the same thing yet. Congress ought to do something about this stock Texas stock should not be allowed to cross the 35th parallel of north latitude alive."

It was during the outbreak of Texas fever of 1868 that "in view of the alarming and continued ravages of the cattle disease in Illinois," a prominent British veterinarian, Prof. Gamgee, was authorized by the United States commissioner of agriculture "to make investigations into its cause and character, and to ascertain and report, if possible, a practical remedy or means of prevention." (63)

Gamgee visited the infected regions of Illinois, Kansas and Texas. After a careful investigation of this disease he advanced a list of twelve possibilities as to its cause, none of which approached the true cause. It is interesting to note the existence of the tick theory at that time, being looked upon by Gamgee as absurd.

ABORTION IN COWS (64).—The report of Dr. J. C. Dalton, commissioner of the New York State Agricultural Society for the investigation of abortion in cows, states that the entire number of sub-reports received was 4,259, from the states of New York, Massachusetts, Connecticut, Rhode Island, New Jersey, Pennsylvania, Ohio, Michigan, Illinois and Iowa. From all the states named cases of abortion among cows have been reported; but, only in New York and Massachusetts have they been sufficiently numerous to excite general attention. In Pennsylvania they were found in Chester and Cumberland counties to reach 10% of all cases of pregnancy reported

A STRANGE DISEASE OF BEES (65).—During the past summer a disease appeared in Indiana, Kentucky and Tennessee, sweeping away whole apiaries. So quiet were its operations that the bee keepers became aware of its existence only after the disappearance of their bees. The hives were left in most cases full of honey, but with no brood and little pollen; the whole appearance of the hive caused the casual observer to suppose the bees had "migrated;" but close observation showed that they had died. . . . The true cause of the disease has not been discovered. Some attribute it to the want of pollen; some to poisonous honey; and some to the unusually hot summer. Whatever may be the cause, the effect has been most disastrous, throughout these states.

1869: DISEASES OF CATTLE (66).—*Pleuro-pneumonia*: Has been the cause of much loss and anxiety in Chester county, Pennsylvania; near Chadd's Ford; on the Octoraro in Beaver county, and in Baltimore, Maryland.

Black-leg: Is one of the most general of the diseases affecting our cattle. A few cases occur in many localities. It attacks calves and young cattle, mainly after leaving winter feeding for pasturage. Reports of its ravages come from Kansas, Iowa, Minnesota, Colorado, and Pennsylvania.

Charbon: So severe for several years past in the South, has abated; isolated cases are reported from Louisiana.

Milk Fever: Has caused some losses in Livingston, Michigan, and Lorain, Ohio.

Splenic or Spanish Fever: The passage of laws to prevent the summer driving of cattle, and in their strict enforcement, have limited the losses from this disease in a marked degree. A few cases are reported. One in Chester county, Pennsylvania, furnishes another illustration of the invariable and peculiar feature of this disease. Last summer a lot of cattle from North Carolina stopped at Avondale. Soon after they left other cattle turned into the meadow they had occupied became sick. Some twenty were attacked and about 3/4 of them died. No other cattle were turned into the same inclosure, and the disease did not spread further. Many believed the ticks which infested the North Carolina cattle, and were communicated to the natives attacked, caused the disease. There is no evidence that these parasites have anything to do with the diffusion or virulence

Murrain: Diseases locally known as "murrain," "bloody murrain," and "staggers," have prevailed to some extent in different parts of the South; but the symptoms are not given with sufficient clearness to enable one to tell the proper name of the disease

DISEASES OF HORSES (66).—It is gratifying to note less of prevalent or contagious disease among horses than has been reported in previous years The *buffalo gnat* has caused the death of horses and mules in Lauderdale, Tennessee.

DISEASES OF SHEEP (66).—For a few years past scab and foot rot have been prevalent among large flocks in New York, Ohio, and several of the Western States

DISEASES OF SWINE.—Either there is something radically wrong in the management of swine, resulting yearly in the loss of millions of young pigs and hogs, or else the genus *Sus* is an unhealthy and unwholesome animal, and therefore unfit for human food (66). One or the other of these conclusions seems to be forced upon the common sense and sound judgement of the observer. The mortality among young pigs, for which the butcher has no responsibility, is nearly, or not quite, proportionate, to that of the infants of the human species and aggregate millions of individuals yearly. What is the cause? It is greatest in the West, notwithstanding the healthfulness of a free range, while eastern pigs are generally shut in close pens. In all accounts of the hog-cholera, which popularly means any disease which sweeps off the species as an epizootic, remedies are unavailing. . . .

1870: FOOT AND MOUTH DISEASE OUTBREAK OF 1870 - 1871 (67).—Cattle shipped from an English port in August, 1870, showed signs of the disease when two days at sea, passed through it on the ocean and landed apparently well, but conveyed it to the stock among which they were placed on their arrival in Canada. Whether it spread from this point or whether there was another importation there is no evidence to show. It was reported in Oneida county, New York, in September. At different times from the 15th of November to the 7th of December, it was brought into Dutchess county, New York, by five separate droves from Albany, which had been carried last on the New York Central Rail-Road. From Dutchess county it was conveyed into Connecticut, where it spread widely. Cattle from Albany also conveyed the disease to Brighton, Massachusetts, and spread it extensively around Boston, reaching at some points into New Hampshire. This outbreak died out of its own accord during the year 1871.

It is interesting to note, that in respect to the milk of cows affected with foot and mouth disease, the report of the Massachusetts Board of Health for 1871 shows that human beings may contract the disease by the use of such milk, and in rare instances the latter is accompanied by eruptions on the body. But when the milk is used by growing children and invalids, more serious consequences may result (67).

DISEASES OF CATTLE (68).—*Diseases From Smut in Corn:* A considerable loss has been attributed to smut in corn in several of the Western States.

Pleuro-Pneumonia: For several years so fatal in the vicinity of Baltimore and the District of Columbia and to some extent in the neighborhood of Philadelphia, has been less prevalent during the last season.

Black-Leg: This section occasions the death of many young cattle each spring in every section of the country, generally attacking those in good condition and ending in death.

Charbon: This virulent disease has nearly disappeared from the South. The report from St. Mary's Parish says that malignant pustule, or charbon, carried off twelve mules on one plantation.

DISEASES OF HORSES (68).—Diseases of horses have not been unusually prevalent or fatal. The most frequent mention is made of “blind staggers”, which has prevailed in Pennsylvania, Maryland, North Carolina, Georgia, Alabama, Texas, Arkansas, Tennessee and Missouri. (Writer’s note: It is probable that the “blind staggers” here mentioned may have been, in many instances, the equine encephalomyelitis of the present day.)

Loin Distemper: Bee, Texas - is quite prevalent among horses on the prairies. It is contagious among the sexes. (Writer’s note: The disease here mentioned may have been dourine.)

1871: DISEASES OF CATTLE (69).—There are a few reports of splenic fever, pleuro-pneumonia and abortion. The following is of interest:

Mad Itch: Santa Cruz, California—A singular disease has prevailed extensively in this county. A local committee was appointed to investigate it. The first symptoms appear to be an itching, with a desire to rub some portion of the body, the friction momentarily allaying the torment, which soon returns with increased violence until skin and hair are rubbed off; the animal becomes frantic and dies in a period varying from 8 to 24 hours after the first symptoms have shown themselves. Sometimes they bleed to death. Little derangement of the secretion is noticeable. There is no fever, and the circulation at first is normal, becoming weaker and more rapid towards the last. Several post-mortem examinations of cattle dying of this disease were made without satisfactory results, as each case seemed to present different features.

GREAT LOSS OF BEES.—A great loss of bees is reported from Iowa, during the winter of 1871-1872. The reports received . . . estimates that at least 2/5 of the whole number of the State have died. . . . (70)

1872: THE HORSE EPIZOOTIC OF 1872 to 1875.—This disease, which was called “influenza” by James Law (71), first attracted general notice through the newspapers, about the last of September, 1872, and was represented as having invaded the United States from Canada, where it had prevailed for some time previous. The reports of J. R. Dodge (statistician of the United States Department of Agriculture), however, show an earlier date of attack at isolated points in the United States. The earliest visitation—about the last of August—appears to have been in Mercer county, on the western border of Pennsylvania. It appeared a little later (September) in Hillsborough and Merrimack, two of the most southern counties of New Hampshire. On September 5th, it appeared in Forsythe county, North Carolina. From September on it was reported in many of the Eastern and Western States, so that by December of 1872, it had crossed the Mississippi River and appeared to radiate about equally in different directions. It appeared in Lewis and Clark counties, Montana, and in Ada county, Idaho; in both localities its introduction was charged upon overland stage companies. It appeared in El Paso county, Colorado as early as December 1st, and later appeared in New Mexico and Utah. It spread through California after first appearing in Plumas county of that State as early as December 1st. In all, the epizootic was reported from 33 states of the United States and in Canada (72).

The average continuance of the disease in individual cases varied considerably, the extreme range being between 5 to 45 days, the minimum being in Franklin county, North Carolina. The averages were somewhat greater east of the Allegheny Mountains. The fatality was small considering the large number of animals affected by the disease. In Maine, five counties reported losses ranging from 1 to 6% of the animals attacked; while, most states reported fatalities around 1 to 5%, Texas reported a loss of 15% of the animals attacked (72).

The mortality of mules and asses was especially remarkable in portions of the South and West. In Navarro and Collins counties, Texas, 50% of the jacks and jennets died; in Cherokee 20%. Tennessee reports a heavy mortality; Hamilton county 8/14; Maury, 20%; Robertson, 50%; Davidson, 67%, etc. Similar mortalities of the asinine tribe are also reported from Kentucky, Ohio, Indiana, Illinois and Missouri (72).

During the fall of 1875 the epizootic re-appeared in nearly all of the states; the symptoms however were mild, and the disease readily yielded to ordinary treatment. The mortality also was much less formidable than during the former visitation. In parts of the country where farm horses are worked hard all winter, as in the lumbering districts, the disease left some permanent injuries in the form of heaves and other abnormal conditions. In some cases the symptoms were so like common distemper as to be mistaken for it (73).

(An epizootic of this nature, during a period when the horse was the principal means of transportation, was a great disturbance to the normal activities of the civilization of the period. The gravity of the situation can be realized by imagining what would happen if a large percentage of the motor vehicles and electric street cars of the present day suddenly broke down.)

It should have been previously related that during 1874, the results of the epizootic had not entirely disappeared. Permanent injury resulted in a considerable proportion of the numbers recovering. In some instances injurious results were for a long time visible; in others, relapses apparently occurred; in ill treated and overworked horses, diseases of the lungs, spine, and kidneys were perhaps more frequent than others (74).

1872: DISEASES OF FARM ANIMALS.—Disease has not cut off an unnecessary number of farm animals the past year. Where cattle are most valuable, whatever the rigors of climate or local scarcity of feed, the loss by disease is comparatively small, by reason of the care which is found by long and bitter experience to be profitable. A large proportion of the diseases reported are the result of neglect, exposure and insufficient and innutritious pasturage or other food. Some mortality and much reduction of flesh result from the inhumanity of drovers, with the aid of abetting or transportation companies. Several deaths were reported from Allegheny City, resulting from the barbarous practice of stuffing cattle with salted feed to induce them to drink, largely for the purpose of making good upon the scales the depreciation in weight occasioned by the deprivation and suffering of the passage by rail. The occurrence of "murrain", "hollow horn", and diseases reported by various meaningless names, so common in the Southern States, where cattle are left to the tender mercies of a vigorous winter, and dead, woody stalks of coarse grass, might be avoided in a large measure by adequate supplies and shelter . . . (75).

DISEASES OF SWINE (75).—The mortality of swine is quite too common to report in detail. The losses by what is called "hog cholera", which is practically any fatal prevalent disease, are most common in the West and South, ranging from 5 to 50% of the entire number in any particular county; and severely infected districts, smaller than counties, a loss from 60 to 75% is not an infrequent record. Prevention is what is wanted; and it must be sought in a better knowledge of the conditions of health, and greater care to secure it.

1873: DISEASES OF FARM ANIMALS (72).—The diseases of farm animals, in 1873, were of the usual character and not attended with extraordinary mortality, the most noticeable exception being influenza among horses. . . .

1874: DISEASES OF FARM ANIMALS (74).—*Horses:* Leaving out of view the relapses from the effects of the epizootic influenza, the record of horse diseases in 1874 would be unimportant. Diseases reported are of a milder type than usual. The fatalities noted are mainly the result of neglect and improper treatment, either in health or after symptoms of disease have been developed. Yet in this respect there is a growing interest. Public sentiment is also awakening to a closer scrutiny of the treatment of the useful animals, thus largely counteracting the thoughtless cruelty, which have too often disgraced our civilization. There can be little doubt that a proper treatment of horses would diminish their liability to disease, and consequently depress the rate of mortality, thus affecting a great saving to the industrial interests of the country.

Cattle: The Texas fever was more or less destructive in the states of Indiana and Kansas. In Fountain, Indiana, 20 deaths followed the contact of natives with Texans. The southern part of Sangamon, Illinois, was visited during the summer, and hundreds died, occasioning great alarm in the community. A large percentage of the cases was among Missouri cattle, which had passed through the St. Louis stock yards. In Missouri several counties report considerable fatality from the presence of Texas fever.

Abortion has been quite common, especially in New York and New Jersey. Deaths from black-leg were reported from all points of the country. Pleuro-pneumonia was spread through the country contiguous to New York by the sale of distillery fed cattle of that city and Brooklyn.

Swine: The most unhealthy of farm animals has not been exempt from "cholera" and other ailments during the past year. The losses were heaviest in the Southern and Western States as usual. As usual, there are localities that have suffered the loss of 20 to 30% of the entire numbers.

1875: DISEASES OF FARM ANIMALS (73).—It is very probable that \$100,000,000 represents scarcely more than the annual losses of farm animals from disease and neglect, of which half could undoubtedly be saved by efficient means of cure and prevention. Persistent and intelligent efforts in scientific investigation, under Government

patronage, ought to result in a saving of millions of this annual loss to production. The proportion of these losses suffered by the pork-producing interests is enormously large, and their reduction is quite as much in the interest of public health as of wealth. - J. R. Dodge.

Cattle: Texas fever—in Berkshire, Massachusetts, in June, cattle imported into two or three towns, from the West, showed the presence of Texas fever, but confined to half a dozen herds. Sanitary measures promptly taken arrested the spread of the disease.

Abortion is a serious evil to the dairy regions. A general desire is expressed from a scientific investigation by this Department (United States Department of Agriculture), to determine its cause and possible means of prevention. Such an investigation is due to this great producing interest. Cases are reported most numerously in New York, New Jersey and Pennsylvania; and, some have been noted in the South and West, and in California.

Pleuro-pneumonia for several years past has been more prevalent in Maryland than elsewhere. Several herds in Burlington county, New Jersey, have suffered from it. This disease has prevailed in milk-diaries, where large numbers are crowded together in filthy stables; and there are complaints of the reprehensible practice of slaughtering and selling the meat on the appearance of the first symptoms of the disease. Ordinary lung fever, resulting from exposure of cattle accustomed to warm stables, is more general in its range, but does not spread by contact.

1876: Returns of the condition of farm animals indicated a general state of health and thrift above average. Feed has been abundant except in sections where little or no precaution is taken to store up hay for winter. Except among hogs, there have been no prevalent epizootic and local diseases reported are mainly either lingering of chronic ailments or euphemisms for emaciation and death occasioned by want of proper food and attention (76).

1877: During this year the Department of Agriculture (United States) gathered much material concerning the diseases of domesticated animals. The correspondence relating to the diseases of fowls was particularly interesting.

CHICKEN CHOLERA (77).—Indiana, La Grange county: The prevalence of chicken cholera in this county is very fatal. Chickens attacked with it sometimes live a day or two, but generally they will die within a few hours. I have fed a hundred head in the morning, all apparently in good health, and at noon have found half of them dead, and perhaps of them remaining, many were staggering around like so many drunken men. Indiana, Washington county: Chicken cholera has prevailed in this neighborhood for years, in a majority of the cases proving fatal to the whole flock.

Ohio, Coshocton county: The principal disease here among poultry is called chicken cholera. The first thing we observe is a diarrhea. The head becomes pale and the fowl commences to droop and is disinclined to move about. There seems to be a fever and a thirst, the fowl drinks very often. Ohio, Meigs county: All farm animals in this locality are comparatively healthy and free from epidemic or prevailing disease. With fowls however the case is quite different. The losses have been heavy and complaints have been heard from every neighborhood of the terrible ravages of what is termed chicken cholera. Whole henneries have been depopulated. No form of treatment appears to check the progress of the disease. Stark county and Williams county report similar incidences.

Pennsylvania, Blair county: There have been very fatal diseases prevailing among the fowls in this locality for some years past. I have known whole flocks to nearly all die, and some of them were perhaps composed of 150 head. Pennsylvania, Greene county: Chicken cholera seems to be permanently located here. It has not been so prevalent, however, the last year as previously. Remedies are numerous but not very satisfactory.

Texas, Washington county: A fatal disease commonly called chicken cholera exists among fowls here. Texas, Columbia county: Heavy losses have been sustained here by a disease known as cholera among chickens and other domestic fowl. Texas, Harrison county: Within the past twelve years a disease has appeared among fowl, which is of a very malignant character, and very fatal in its results.

1878: FIRST STEPS TOWARDS A NATIONAL CONTROL OF ANIMAL PLAGUES.—William G. Le Duc, Commissioner of Agriculture from 1877 to 1881, during his first year in office recognized the necessity of taking measures to investigate the disease of domesticated animals. He apparently took the step that eventually led to the

establishment of the Bureau of Animal Industry in connection with the Department of Agriculture in 1884. The following quotation is from his report for the year 1878 (78):

“During the past twenty years, or more, the spread of infectious or contagious diseases among domesticated animals in this country has been very rapid, and increasingly destructive and malignant. So wide spread and fatal had many of them become that I determined, a year ago or more, to institute a preliminary investigation looking to discovery of the cause and a remedy for some of the more virulent and destructive of the maladies. No funds being available for this purpose, all that could be done was to correspond with the leading stock raisers throughout the country, hoping thereby to elicit information touching the annual losses of farm stock from the various diseases incidental to this class of property, the character of the maladies most prevalent and fatal, and what remedies, if any, where used. A large number of circular letters were forwarded to the regular correspondents of the department, and to many others engaged exclusively in stock raising. Replies were received from every section of the country. These letters contained much valuable information, which was called for by resolution of the United States Senate, February 20th, 1877.

“. . . These returns are as accurate as could be given in the absence of an absolute census, but for less than one-half of the territory of the United States they show annual losses amounting to \$10,091,483 in swine alone and for all other classes of domesticated animals the losses were given in the same counties at \$6,561,945, making a grand total of \$16,653,428.

“Those figures indicate that the losses of farm animals throughout the United States annually aggregate the sum of \$30,000,000 or more. As at least two-thirds of this amount seemed to be sustained in the loss of swine from affections which appeared to be but little understood by the farmer and stock raiser, I regarded the subject of sufficient importance to call for an appropriation to defray the expense of a scientific investigation into the causes of many of the more malignant, infectious and contagious diseases of domesticated animals, but more especially of those incident to swine.

“The sum of \$10,000 was appropriated for this purpose, and as soon as the fund was available, examiners were appointed in the states of New York, Indiana, Illinois, Iowa, Kansas, Missouri, and North Carolina. These examiners were instructed to devote the brief time allotted to them to an investigation of diseases of swine . . .”

William G. Le Duc saw to it that the work of investigating the diseases of domesticated animals was not only maintained, but, increased during every year of his stay in office. In 1880, during his last year in office, he expressed the need of a division of veterinary science attached to the United States Department of Agriculture, as follows (79):

“The ravages of disease in this country among various animals of economic value have become alarmingly great. How this destruction which has taken and is taking millions from the wealth of the nation may be stopped and its recurrence be modified, if not entirely prevented, is a subject which demands the immediate attention of the government. In no way can the remedy be made so effective as through a suitably organized division of veterinary science attached to this department. . . The health of the people and the maintenance of their large and valuable foreign trade in cattle, now grown into an important factor of commerce, alike call for prompt action in the matter, in the direction here indicated.”

1879: DISEASES OF SWINE INVESTIGATED.—During this year nine veterinarians and physicians were appointed by the United States Commissioner of Agriculture to investigate the so called swine plague disease, in the states of Illinois, New York, Indiana, North Carolina, Iowa, Virginia, Missouri and Kansas.

The work of these investigators was issued by the Department in the form of a special report, of which 100,000 copies were printed for distribution (80).

1880: CONTAGIOUS PLEURO-PNEUMONIA - SUPPRESSION CALLED FOR (81).—In 1878 Commissioner Le Duc asked for the “considerate attention of Congress” in providing means to extirpate the contagious pleuro-pneumonia of cattle, before it should be communicated to the “countless herds west of the Allegheny Mountains.” He pointed out the fact that every European government in which the disease had appeared, in many cases it had been necessary “to expend millions of dollars in its suppression.”

In 1879 James Law, of Cornell University, issued a work of about 100 pages, in which he gave a complete history and description of the disease. Charles P. Lyman, a British veterinarian not long in America, was appointed

by Commissioner of Agriculture Wm. G. Le Duc, to investigate this disease. Lyman visited many of the infected localities and accumulated much information concerning the distribution of the disease (81).

In 1879 the veterinary department of the Privy Council of Great Britain announced the "removal of the United States from the list of countries from which cattle could be imported as healthy, owing to the landing at different times during the year of animals affected with pleuro-pneumonia." In response to this action upon the part of the British Government, Commissioner Le Duc ordered Chas. P. Lyman to England to investigate the matter (82). In concluding his investigations in England, in 1881, Lyman wrote:

"My own opinion, arrived at after a careful and thorough investigation and consideration of the facts, is that the lungs that were condemned by the inspector of the privy council at Liverpool during my stay there in parts of July and August last, as being affected with contagious pleuro-pneumonia, were in reality not affected with that disease . . ." (82)

During 1880 the Department of Agriculture commenced an investigation to determine the exact extent of territory in which there existed any cattle affected with contagious pleuro-pneumonia. After due time and a thoroughly conducted investigation, this territory was defined to be existing (at that time) from Fairfield county in Connecticut, over New York City and portions of the State of New York lying just north of it; Brooklyn, Long Island, and parts of the island lying just east of it; Jersey City, and over a considerable portion of the State of New Jersey; Philadelphia, and some of the more southeasterly counties of Pennsylvania to Baltimore, and over portions of the more northeasterly counties of Maryland (82).

FOOT AND MOUTH DISEASE DURING 1880 (83).—This disease has been landed in Great Britain in several instances among cargoes of sheep, and once in a cargo of bullocks from the United States. Investigations immediately instituted by the Department of Agriculture (United States) revealed its possible prevalence in several localities (83).

1881: FOOT AND MOUTH DISEASE IN NEW YORK CITY.—Two bulls and eight heifers brought to New York City on the steamship France, upon inspection, were found to be affected with the foot and mouth disease. The animals were promptly quarantined and no harm resulted. They subsequently recovered from the disease (84).

VARIOUS DISEASES.—Anthrax in the West (85): Nebraska and Iowa are reported as suffering severe losses among cattle. Thousands of animals are said to have died from various forms of anthrax.

Pink Eye in Pennsylvania (85): More than 1,000 horses are suffering from pink eye at Pittsburg, Pennsylvania. Several animals have died. Business is suffering in consequence of the prevalence of the disease for which no adequate remedy has yet been discovered.

Lung Worm Disease of Calves (85): The mortality among the calves taken west this season is terrible, caused mainly by exposure, change of climate, feed, etc., and by a disease known as lung worm, the lungs of affected calves being full of worms of a thread like character. It is reported from Shenandoah, Iowa, that out of 947 head taken to that neighborhood, over 400 have died.

1882: NATIONALLY ORGANIZED VETERINARY SCIENCE ABSOLUTELY NECESSARY (86).—George B. Loring (Commissioner of Agriculture, 1881-1885) during his first year in office showed much interest in the work of the veterinarians of the Department of Agriculture concerning the diseases of domesticated animals. Much of his report for the year 1881 was made up of material concerning the diseases of live stock. Thus, in his report for 1882, he wrote (86):

"The call upon the department for veterinary investigation, during the year 1882, has been very great. The sudden and unaccountable outbreak of disease among domesticated animals has been a matter of great anxiety in many portions of the country. As the number of our cattle, horses, sheep, and swine increases, the outbreaks of contagious diseases also increases. The annual disturbances, moreover, incident to the work and confinement to which all classes of domestic animals are subjected, which are held in immediate domestication, also increase as our population grows more and more dense.

"To meet the call upon which this state of affairs creates, I have been obliged to depend upon such temporary and outside services as I could obtain. The absence of a well organized veterinary division has been severely felt in

the department, and it is of the utmost importance that such a division should be established, in which all investigations can be directed by a competent head, and on which the owners of live stock can call for counsel and aid. It is important to know the precise extent of existing disease. It is important to know how to guard against the spread of contagion and how to provide for its removal. It is important to know, if possible, the most economical remedies for disease, and how to best avoid the vast annual loss of animals from bad treatment and exposure. It is important also to ascertain, by the most careful investigation, the breeds best adapted to different localities and purposes in our country. To do this a well organized division of veterinary inquiry and animal industry in this department is absolutely necessary."

STRANGE DISEASE OF BIRDS.—New Jersey - Some strange disease is killing birds in different parts of New Jersey. They are found dead upon lawns, and roads, and each with a hard lump or swelling in the throat. Robins, wrens, sparrows, and thrushes are all alike affected.

1883: MORE COMMENTS BY G.B. LORING.—The Commissioner of Agriculture, G.B. Loring, in his report to the President of the United States, for the year 1883, wrote (88):

"I have established near this city (Washington, D.C.) an experiment station for the investigation of contagious diseases of domestic animals. D. E. Salmon, D.V.M., who has been in the employ of the department for a number of years, has been placed in charge of this station. One of the most important objects of this investigation is to test the practicability of a system of vaccination as a preventive for some of our most widespread and destructive diseases. The virus of swine plague has been successfully cultivated and attenuated, but it will require further investigation to determine the protective influence, and the danger, if any, attending its use. Very limited outbreaks of disease, supposed to be contagious pleuro-pneumonia, have been reported from Connecticut, Pennsylvania and Maryland, each of which has been investigated by the veterinarian (Salmon), and will be fully described in our next report. While Texas or southern fever of cattle has not been so destructive in Virginia as last year, it has proved very disastrous in many localities. During the year outbreaks of this disease were reported as prevailing in Pennsylvania, Maryland, at Charlottesville and Norfolk, Virginia; in Pawnee, Harper, and Barbour counties, Kansas; in many places in northern Georgia and southern Tennessee, and at Fort Davis, Texas.

ABORTION OF DAIRY CATTLE CAUSES GREAT LOSSES (89).—This disease, which evidently depends upon some form of contagion for its causation, has been estimated to produce an annual loss, in New York State alone, of several millions of dollars. At present the affection is widely distributed over the country, and if the estimates in regard to New York were not greatly exaggerated, the annual loss from this source must be equal to or greater than from any other disease. The dairymen have settled down to the conclusion that nothing can be done to check this scourge, and they dislike so much to have its presence in their dairies known that the public hears little in regard to it. - D. E. Salmon.

TRICHINA AGITATION REVIVED.—Around the year 1883 many countries of Europe prohibited the importation of American pork, with the charge that it was infested with the trichina spiralis.

The famous William Osler, M.D., from the examination of one thousand hogs in the slaughter houses of Montreal arrived at the following conclusion (90):

1. The investigation shows that the hogs slaughtered for our market presents parasites in numbers sufficient to necessitate a more thorough inspection than is at present carried out.

2. As regards Trichina spiralis, which was found in the proportion of 1 to 250, we are of the opinion that, considering the extreme rarity of cases of trichiniasis, and the difficulties attendant upon a systematic inspection, a compulsory microscopic examination of the flesh of every hog killed is not at present called for.

* * * * *

5. The public should be made aware of the possible dangers of eating in any form, raw or partially cooked meat. The best safeguard against parasitic affections is not so much inspection of the flesh, unless indeed, this is carried out, as careful attention to culinary details.

6. To reduce the number of infested hogs, greater attention should be paid to their hygienic surroundings. . . .

The renowned German pathologist, Rudolph Virehow, is said to have come out in favor of American swine by declaring that their being shut out from Germany was a political and not a sanitary measure (91).

During the summer of 1883 the President of the United States appointed a so-called American Pork Commission to investigate the swine and pork business in this country. The commission was instructed to investigate the whole subject, especially the charges of the foreign countries on American pork (92).

D. E. Salmon, of the commission, reported in part as follows (94): "The alleged frequency of trichiniasis in American hogs has been the reason insisted upon by the various countries which have prohibited the importation of such products; for, while it is true that other objections have been advanced, particularly in France, none of these have sufficient foundation in fact to stand the test of even a superficial examination. It is, however, not a question of trichiniasis here and its absence in other countries, since this parasite has been found infesting the hogs and other flesh eating animals in the most widely separated portions of the earth."

1884: A NATIONAL BUREAU OF ANIMAL INDUSTRY (95).—The following is an extract from the act establishing the Bureau of Animal Industry in connection with the Department of Agriculture, approved May 29, 1884 (95):

"Be it enacted by the Senate and House of Representatives of the United States in Congress assembled, That the Commissioner of Agriculture shall organize in his Department a Bureau of Animal Industry, and shall appoint a Chief thereof, who shall be a competent veterinary surgeon, and whose duty it shall be to investigate and report upon the condition of the domesticated animals of the United States, their protection and use, and also inquire into and report the causes of contagious, infectious and communicable diseases among them, and the means for the cure and prevention of the same, and to collect such information on these subjects as shall be valuable to the agricultural and commercial interests of the country; and the Commissioner of Agriculture is hereby authorized to employ a force sufficient for this purpose, not to exceed twenty persons at any one time. . . ."

ACTINOMYCOSIS IN AMERICAN CATTLE.—Non-scientific reports of what appears to be actinomycosis disease of cattle, have been given under the years 1833 and 1841; and, was mentioned at that time as a "hold fast", "tumor on the jaw", and "swelling or lump on the jaw."

The causative agent of the disease, the ray fungus, was discovered by Bollinger, of Munich, in 1877, and in 1883, George A. Bodamer, a physician of Philadelphia, reported finding the ray fungus in the lesions of an ox affected with "swelled head" (96). The disease was positively reported by James Law in 1883, and by Wm. T. Belfield, of Chicago, in 1884. Belfield had been asked by the Commissioner of Health of Chicago to investigate a disease in cattle that was generally known as "swell head" which had been called by veterinarians, cancer, sarcoma, etc. The reports of Belfield were the first to receive wide recognition in America (97).

TEXAS FEVER WIDELY DISTRIBUTED IN UNITED STATES.—Up until this time little was known concerning the geographic distribution of the Texas or Southern cattle fever in the United States. Thus, it is recorded by Salmon (98) that "the losses which occur every summer, and which in some years have been really disastrous to the stock owners of certain sections, have been largely the result of ignorance of the districts from which it is dangerous to bring cattle in summer, and to which adult cattle cannot be taken with safety at any season of the year, unless they are to be slaughtered for beef within a short time after their arrival."

During 1884 D. E. Salmon, first Chief of the Bureau of Animal Industry, employed special agents who carefully traversed every county along the border line of the infected district, and investigated the cattle diseases with sufficient detail to locate the limits of the infected district in most counties with very great accuracy (98). In 1893, concerning this matter, Theobald Smith wrote (99): "The investigations of D. E. Salmon have shown that this permanently infected area does not extend north of the 37th parallel of latitude excepting along the eastern slope of the country, where it extends half way between the 38th and 39th parallel. . . . The line as at present (1893) defined begins at the Atlantic coast, passing westward on the 38th parallel, and follows the lower border of Maryland to the Potomac. It then passes westward across Virginia as far as the eastern slope of the Blue Ridge, which it follows in a southwesterly direction through North Carolina, thus exempting the cooler mountainous regions of these two States from permanent infection. It continues in a nearly westerly direction across the southern strip of western North Carolina and the southern portion of Tennessee. Across the Mississippi it follows the northern boundary of Arkansas and that of the Indian and Oklahoma Territories and finally passes southward through Texas on or near the 100th meridian."

GREAT DESTRUCTION OF LIVE STOCK BY BUFFALO GNATS (100).—The species concerned in the damage in the southwest, which goes by the name "buffalo gnat", has not as yet been specifically named, but they are known to be of the order Diptera, family Simuliidae. For many years past one of the greatest pests the stock raiser of the South and West has had to contend with has been this pest. The insect is a small fly, closely related to the well known "black fly" of the northern woods. At certain seasons it swarms in immense numbers, and by its poisonous bite, multiplied a thousand fold, causes great destruction among sheep, hogs, poultry, cattle, horses and mules.

A destruction of horses due to gnats has been mentioned under the year 1826 as occurring in Tennessee, and was again reported as occurring in the same State under the year 1869.

In 1872 it was reported that the loss of horses in Crittenden county, Arkansas, from this source, exceeded the loss from all diseases. In 1874 the loss by the gnat in one county in southwest Tennessee was estimated at \$500,000. It has been especially injurious since the Mississippi floods of 1881 and 1882. In June 1882, the buffalo gnat appeared in eastern Kansas in immense numbers, in western Tennessee and western Mississippi, and the great destruction of cattle, horses and mules caused by it has added to the distress of the inhabitants of those sections of the country caused by the unprecedent floods (100).

Winnsborough, Franklin Parish, Louisiana (101).—Fully one-half of all the farm animals of this parish (during 1884) have fallen victims to the poison impregnated by the bite of the buffalo gnats. Horses, mules, cattle, sheep and hogs have alike succumbed to the scourge, and there seems to be no abatement except in localities where the material to act upon has disappeared or been exhausted. Some persons have lost all, others two-thirds, and he is indeed fortunate who has saved half his stock. The dead carcasses lie bloating around fields and on highways, and nothing—not even a buzzard—will touch them. The stench arising from these putrid carcasses is almost intolerable, and fears are entertained that a pestilence will follow. . . . As far as we are able to ascertain the deaths in two wards amounted to 3187. Many individuals, in handling and skinning the animals, have been poisoned. Some have already died, others will probably die, while still others will escape with the loss of an arm or a hand.

Oakley, Louisiana (101): This year (during 1884) they came about the first of April, and in a few days multiplied into millions, and no animal could survive their attacks many hours unless protected by smoke. They have a great aversion to smoke, and this is the only protection our animals have from its ravages. Work animals are greased as an additional protection. The gnats were more numerous this year than common, but not more so than they were in 1882. In this parish (a small one) about 3,000 head of horned cattle died in a few days, and about 300 head of horses and mules, 5,000 or 6,000 head of hogs and as many sheep. The horses and mules are still dying at intervals. In these the disease assumed the form of charbon; it did the same with many cattle; and what is singular, the only horses, cattle and mules that recovered were those that it attacked in that form. All those attacked in the other form of the disease (i.e., without external swelling) died. . . .

Arkansas: In Arkansas (during 1883) the destruction of horses, mules and cattle is fearful. It is dangerous to drive stock through the bottom lands of Desha and Chicot counties, as the gnats are there by the millions. . . . (102).

Mississippi: Mississippi (during 1884) reports fully 1,500 mules in Yalobusha and Grenada counties as having fallen victims to buffalo gnats within the last week. . . . (103).

Attacking Man: While inquiry has sometimes failed to prove the truth of such reports, in 1884 several persons were killed by buffalo gnats (104). Mr. H. A. Winter, from near Helena, Arkansas, while on a hunting trip was attacked by them one and one-half miles from home, while passing some low ground. Running towards a house he was seen to fall dead. All exposed parts of his body had turned black. . . .

ENZOOTIC ERGOTISM - FALSE FOOT AND MOUTH DISEASE (105).—Early in March, 1884, a disease among cattle of Coffey county, Kansas, which was supposed by certain veterinarians to be foot and mouth disease in a most virulent form, was brought to the attention of the officers of that State; and such exaggerated accounts were sent to the press from day to day as to cause a feeling of alarm and insecurity among all engaged in the live stock industry in the West. The governor and senators from Kansas telegraphed the Commission of Agriculture (at Washington, D.C.) of the supposed outbreak of foot and mouth disease in their State. . . .

The excitement became so great that the Commissioner of Agriculture directed Dr. Salmon (Chief of the Bureau of Animal Industry) to proceed to Kansas to investigate the nature of the disease to see what action, if any, was necessary to hold it in check. Dr. Salmon reached Neosho Falls, Kansas, March 19th, and after a careful investigation was able to telegraph the Commissioner of Agriculture that the affection was not foot and mouth disease, but that it had been produced by local causes and that there was no danger of it spreading. He also visited

Kirkville, Missouri, where he found an outbreak of the same disease as existed at Neosho Falls, and from there returned to Washington.

Kansas, Iowa, Colorado, Texas and Wyoming commissioned veterinarians to report upon the nature of the disease and the necessity of quarantining all cattle, sheep and pigs from Kansas. Fortunately each of these states received a report that foot and mouth disease did not exist in Kansas, and what threatened to be an almost complete suspension of the live stock industry of the West, was averted. There is no doubt however, that the cattle industry suffered a considerable loss from the excitement. The market became unsteady, the price of cattle declined, and buyers became exceedingly cautious.

Dr. D. Mc Eachran, live stock inspector for Canada, visited Neosho Falls, Kansas, and Effingham, Illinois, as the representative of the Canadian Government, and positively asserted that the malady at both places was the real foot and mouth disease of Europe. Dr. Holcomb . . . State veterinarian of Kansas, reported to the governor that six healthy cattle cohabitated with the sick animals had all contracted the disease, and that further experiments by inoculation would at once be made.

It now seemed that a repetition of the former excitement and panic was about to occur, and Dr. Salmon was again directed to visit Kansas a second time, with instructions to make such experiments as might be necessary to demonstrate the non-contagious nature of the disease beyond question. On March 21st, at a conference with the State veterinarian, and Prof. Law, of Cornell, the State veterinarian admitted that all attempts to convey the disease by inoculation upon cattle, rabbits and sheep had failed, that the second experimental lot of cattle which had cohabitated with the first lot when they were supposed to be suffering with the foot and mouth disease had not been in the least affected; that the foot symptoms of the first lot had only been noticed with two animals, were very slight and of exceedingly short duration; and finally, whatever the disease might be, it was not the continental foot and mouth disease.

On his return to Washington Dr. Salmon visited the herds in the vicinity of Effingham, Illinois, examined the cattle and the food and found that the disease there was identical with that in Kansas and Missouri, and that it was in every case traceable to the ergot which existed in great abundance in the hay.

Summary for the Period 1866 to 1884

This proved to be a very eventful period—plagues and other diseases became widespread among most species of domesticated animals, provoking national interest, attention and action. The following seems to be particularly outstanding or otherwise important:

1. A National Bureau of Animal Industry—Animal plagues became so widespread and destructive during the latter half of the 19th century that Commissioner of Agriculture Capron, during 1868, 1869 and 1870, openly and forcefully expressed the need of well organized veterinary colleges and a division of veterinary surgery in connection with the Department of Agriculture.

Commissioner Le Duc, during 1878, urged that Congress appropriate money for the purpose of investigating the diseases of domesticated animals; and, during 1880 he expressed the need of a division of veterinary science.

Commissioner Loring, in 1882, reported that a division of veterinary science and animal industry was absolutely necessary. A veterinary experiment station was established at Washington, D.C., during 1883.

By 1884 the condition of our live stock was such as to demand the creation of a bureau of animal industry, whereby nationally organized veterinary science could be so utilized as to serve as the protectorate of the health of our live stock. Such a bureau was officially created in connection with the Department of Agriculture on May 29, 1884, with a veterinarian as its chief.

2. Pleuro-pneumonia reported to be spreading in the states of New York, New Jersey, Pennsylvania, Maryland, Rhode Island, and Connecticut, causing much anxiety and somewhat heavy losses from time to time. In 1878 Commissioner of Agriculture Le Duc urged Congress to provide means to extirpate the disease.

3. Texas fever, especially due to Texan cattle, caused heavy losses in many states of the Union (Kansas, Missouri, Kentucky, Illinois, Indiana, Ohio, New York, New Jersey, Pennsylvania, and Massachusetts) from time to time. Funds were provided by the Department of Agriculture to study the disease in 1868. The geographical

distribution of the disease was established by agents of the Bureau of Animal Industry in 1884, revealing the presence of a large infected area south of the 37th degree parallel.

4. Hog cholera annually spread disaster among the swine of many Southern and Western States, losses of from 50 to 75% in some counties not being infrequent. The Department of Agriculture hired veterinarians to study the disease as early as 1878.

5. Abortion disease of cattle was reported as causing trouble in 10 Eastern and Mid-Western States, especially so in New York and Massachusetts.

6. Foot and mouth disease was introduced from Europe in 1870, and was reported from New York, Massachusetts, Connecticut and New Hampshire. Minor reports of the disease during 1880 & 1881.

7. Enzootic ergotism caused considerable alarm on being reported by State authorites as foot and mouth disease (1884).

8. Trichinae of American pork attracted considerable attention, especially during 1883, and was used by European countries, evidently for political reasons, as an alibi to refuse admittance of American pork.

9. Evidence of dourine in Texan horses (1866, 1870).

10. Nation wide outbreak of influenza among horses (1872 - 1873), which interrupted business activities of the nation by causing a partial stagnation of transportation.

11. Chicken cholera reported as causing heavy losses in many states (Indiana, Ohio, Pennsylvania, and Texas).

12. Actinomycosis of cattle officially recognized (1884).

13. Great destruction of livestock due to buffalo gnats in many Mid-Western States (Tennessee, Arkansas, Kansas, etc.)

PART IV—PERIOD FROM 1885 TO 1900

The period from 1885 to the beginning of the twentieth century parallels a corresponding period during which the veterinary profession of North America was rapidly being developed. From 1880 to 1900, over twenty veterinary schools were formed throughout the continent. The census of the United States for 1880 lists 2,130 veterinarians, while the census for 1900 lists 8,163, or an increase of almost 300% in twenty years. Previous to 1880 there were but few veterinary schools and a correspondingly low number of veterinarians.

Many of the states created the office of state veterinarian (or a similar office), the functions of which were similar in nature to the functions of the national bureau of animal industry. Numerous laws were enacted by the states to facilitate the control and eradication, and to prevent the spread, of animal plagues. Thus, during this period, a mechanism was set up whereby the national and state veterinary police forces, in cooperation with the private practicing veterinarian, were able to combat the spread and the very existence of animal plagues.

The writer cannot help but repeat that if the individuals responsible for the welfare of our livestock had sooner turned to organized veterinary science, much concerning the deplorable state of affairs, concerning their health, would have been avoided. The public, it is apparent, turns to organized science only after a depletion and hopeless failure of unorganized so-called practical methods.

1885: PLEURO-PNEUMONIA WEST OF THE ALLEGHANIES (106).—. . . At the time the act establishing the Bureau (of Animal Industry) was passed by Congress it was not known that the disease called pleuro-pneumonia among cattle existed in any part of the United States west of the Allegheny Mountains, but in August, 1884, it was discovered in the State of Illinois, and an investigation by officers of the Bureau revealed a very extensive and alarming outbreak, involving herds in Ohio, Illinois and Kentucky. . . . Geo. B. Loring, Commissioner of Agriculture.

1886: PLEURO-PNEUMONIA AT CHICAGO - A CRITICAL PERIOD (107).—Norman J. Colman, Commissioner of Agriculture, in his report to the President for 1886, wrote:

“The most important work of the bureau (of animal industry) has been the investigation and control of the contagious diseases of animals. Our vast areas of productive pasture lands, our enormous crops of grains, and our salubrious climate have led to a most remarkable development of the flocks and herds of the country. With this increase in the number of animals, their constant importation, and free movement between all parts of the country, contagious diseases have been introduced and disseminated to an alarming extent.

“Most important at this time is the contagious pleuro-pneumonia of cattle. . . . About three years ago the contagion of this disease was carried to Ohio, from Ohio to Illinois, and from Illinois to Kentucky and Missouri. After a continued application of all the authority granted under the national and state laws the plague was extirpated from Ohio, Missouri, Kentucky, and it was thought to be also eradicated from Illinois. Unfortunately it was again found to be in existence in and around Chicago in September last. A thorough investigation has shown that the contagion has been disseminated among the cattle in the distillery stables and among those running at large on the streets and commons of the city and suburbs. Many animals have been exposed. . . . With such a plague as this existing in the great live stock center of the country, threatening to impair both the quantity and quality of our food supply, and increasing the insecurity of our export trade in live cattle and in cattle products, it would have been most fortunate if every animal exposed to the disease . . . (had been) slaughtered.

“With a disease of this character at Chicago it has been truly said that the cattle industry of this country has reached a crisis. There can be no doubt that it will be soon and widely disseminated unless prompt and effectual action can be instituted for its speedy suppression.”

A FATAL PARALYSIS AMONG HORSES - PROBABLY DOURINE.—Elko county, Nevada (108): We have a new and very fatal disease which has lately attacked horses in this section of the State and we are at a loss to know

how to treat it. The disease is confined mostly to mares. The animal is generally attacked when in good condition. The first symptom is a breaking down in one hind leg, the use of which they lose almost entirely. The flesh shrinks away from around the hip and stifle joint. In the course of a month or so the disease will attack the other leg, and death soon follows. We have lost 40 animals by the malady in this country during the fall and winter. . . .

. . . The disease certainly acts like paralysis, but I don't think it can be that, for in a number of cases it has attacked mares on the range that have never been handled or overworked. It has appeared in this country separated by a hundred miles. . . . I have met a resident of the country who resides about thirty miles distant. He had a herd of 30 head of horses, and two or three months ago 10 of his animals were attacked by the disease and 8 of them died. . . .

MORE ABOUT BUFFALO GNATS.—At the request of many prominent planters of the Lower Mississippi Valley an investigation has been begun into the habits and remedies for the Southern buffalo gnat, an insect which almost annually, and particularly in seasons of overflow, causes great loss of life among the stock in that region. . . . (109).

Buffalo gnats are of the order Diptera and the family Simuliidae. . . . Although we possess in the United States a great number of the species *Simulium*, only a few of them are so very troublesome as to have attracted special attention. . . . The popular name "Southern Buffalo Gnat" includes at least two species and others will doubtless be found to contribute to the injury when the regions are better studied entomologically. . . . The popular name Buffalo Gnat has been chosen not because these gnats ever attack the animal of that name, but because of the fancied resemblance to the shape of the same. . . . from the side, it reveals a very large hump backed thorax, with the head furnished with two short antennae, like miniature horns - in the act of butting an enemy. The name "Turkey Gnat", however, has been given to one of the species concerned, because it appears at a time when turkeys are setting and suffer so much by them. . . .

Geographical Distribution—The species *Simulium pecuarum* n. sp. has caused trouble in the States of Louisiana, Mississippi, Kentucky, Illinois, Indiana and Eastern Kansas. . . . It was of general opinion in these States that the gnats came only with high water and were contemporary with an overflow. . . .

Animals Injured—Domestic animals were attacked somewhat in the following order, varying somewhat in the different localities, viz. mules, horses, cattle, sheep, setting turkeys, hens, dogs and cats. The death rate of mules is highest because they seem to be more susceptible to the bite, and because they are almost exclusively used in the Southern States for farm work. Horses also suffer greatly. Cattle when weakened by winter exposure and scarcity of food, succumb easily to the continued attacks of their winged foes. Hogs show at first the effects of the bite but very little; yet large numbers die soon after the attack, while others die about six weeks after the disappearance of the Buffalo Gnats; they usually perish from large ulcerating sores which cause blood poisoning. Many persons claim that the so-called "charbon" is produced by the bites of these gnats, a statement which is, of course, not borne out by facts. Sheep, although well protected by their wool, suffer greatly by bites upon the unprotected portions of their skins, and injure themselves still more by crowding too close to fires, which are built to produce protecting smoke. Many sheep crowd so close to the fire as to be burned to death. Setting hens and turkeys are frequently forced by the gnats to leave their nests. Young fowls are killed outright. The gnats in attacking fowls of all kinds, force their way under the wings of victims, where they cannot be dislodged. Dogs and cats are also greatly tormented, and will not remain outdoors during a Buffalo Gnat invasion if they can help it. Deer, forgetful of any other danger, are tormented to such a degree to lose all fear, and approach the smoldering fires; in their agony they will sometimes allow people to rub the gnats from their bodies, and will, in their frantic endeavor for relief, even lie down in the glowing embers or hot ashes.

Effect of the Bites—. . . Dr. Warren King, of Vicksburg, opines that the effect of these bites on animals are much the same as that of the rattlesnake on the human system. This seems to be the generally accepted opinion among the more intelligent planters. The animal attacked becomes at first frantic, but within a short time it ceases to show symptoms of pain, submits passively to the infliction, rolls over, and dies; sometimes all within the space of three or four hours. Even if bitten by a very great number of gnats, death does not necessarily follow, and then it is not always suddenly fatal. Mules which at night do not appear to be seriously injured will often be found dead next morning. Animals of various kinds become gradually accustomed to these bites, and during a long continued invasion but few are killed during the end of it.

Prevention—Smudges have thus far proved the best method of protecting animals in the field. . . . Thoughtful planters are in the habit of collecting and storing during the year all kinds of materials that will produce a dense and

stifling smoke, such materials as old leather, cast off clothing, dried dung, etc. As soon as large swarms of gnats appear, and the stock are threatened by them, fires are started in different parts of the plantation, and are kept burning as long as the danger lasts. . . . Animals may also be protected by a layer of mud or a coat of sirup. . . . Buffalo Gnats have a great aversion to entering dark places, and stables thoroughly darkened are safe places for stock of all kinds in a gnat season. . . .

1887 and 1888: PROGRESS IN PLEURO-PNEUMONIA ERADICATION.—(110). . . During the first six months of the outbreak at Chicago, Illinois, there was no authority to purchase and slaughter exposed animals, and an insufficient sum was available for the destruction of those actually diseased. The appropriation act for the year 1887-88 gave additional authority, however, and from the time it went in to effect the work has gone on successfully. . . . The Western States, and all of the interior districts of the Eastern States, have been freed from the contagion. The disease no longer exists in Virginia or Pennsylvania. In Maryland it is confined to Baltimore; in New Jersey it is confined to Hudson county; in New York it is confined to New York City and to Brooklyn and its suburbs. In all of these places infected herds are slaughtered as soon as discovered, and the premises where they have been are thoroughly disinfected. No other states are infected.

The enforcement of proper regulations to prevent the dissemination of the contagion, together with these energetic measures for its suppression, have rapidly narrowed the infected areas. - D. E. Salmon.

DOURINE IN ILLINOIS (111).—The presence of one more contagious disease added to the other dangers which our domesticated animals are exposed, and at length official reports that dourine, or maladie du coit, had made its appearance in the West were made. . . . Dr. W. Williams, assistant State veterinarian of Illinois, immediately investigated an outbreak in De Witt county of the State. Two imported stallions were reported to have died from it, and nine were ill. It was said that twenty mares died from the disease and some fifteen were still affected. A number of stallions were subject to quarantine . . . 200 mares were quarantined by Dr. Williams. . . .

. . . Three sources of origin were suggested. First, it was supposed that the disease was introduced direct from France by Harrold and Culbertson of Wapella, in January, 1884, when they imported 19 French draft stallions. . . all of good quality and showing no evident sign of disease. In 1884 one died from injuries and three were sold, which so far as could be learned were free from disease. In 1885 one died from unknown cause and one was sold to . . . of Wapella, and two to . . . of Wapella. In 1886 two horses died, one probable of venereal disease and the other of unknown causes, and two were sold to California parties, which are reported well. In 1887 there remained seven horses, six of which were used on the Harrold and Culbertson farm and all badly diseased, while the seventh was used for stud at Danvers, Illinois, and remained sound.

In April, 1884, Harrold and Culbertson brought from Texas 236 selected Western horses, about 170 of which were pregnant mares, which dropped and reared healthy foals. These mares were then bred to such stallions as were on hand in the years 1884 and 1885, nearly all dropped healthy foal in time. The stallions in addition served such outside mares as were offered. No signs of the disease were noticed in 1884, but as the disease was unheard of and unexpected, no special notice was taken of it until the spring of 1886, when the disease assumed so alarming proportions in both mares and stallions that all breeding was discontinued on the Harrold and Culbertson farms. The second theory of origin is by means of the Texas mares. . . .

The third and most tangible theory is that the disease was introduced direct from France, by the imported "Moore" horse, imported in 1882 by . . . of Monticello, Illinois, at the age of three, sold in spring of 1883 to . . . of Clinton, Illinois, and placed on stud at Clinton serving a large number of mares, most of which became impregnated and dropped healthy foals. In 1884 he continued for a time without complaint from patrons, but before the season was far advanced the genitals became swollen and penis sore in several places. The preputial ring of the penis was sufficiently ulcerated to destroy the ring at the front part. At the upper part of each flank were extensive ulcerating sores, which healed tardily, leaving large unsightly scars. On the left side of the crest of the neck there appeared a very plain brand of the letter DN, which according to Prof. Law and Dr. Paquin, unmistakably indicates that this horse had been condemned by the French veterinary authorities for maladie du coit. . . . Nothing was thought of the matter until the disease broke out in alarming proportions and . . . in tracing back the stud records of affected mares, the Moore horse was met with. . . . Report of W. L. Williams.

TWO DISTINCT SWINE PLAGUES.—(112) . . . permit me to say that we have two diseases of hogs in this country which have heretofore been confounded as one plague. One of these diseases is characterized by hepatization of the lungs, and is accompanied by cirrhosis of the liver. . . . This disease is quite similar to the schweinseuche of Germany, and may possibly be identical with it.

The second disease is the one described in the Bureau of Animal Industry report of 1885. Its most characteristic lesion is an ulceration of the large intestine, particularly in the region of the ileo-caecal valve. . . . These two diseases are sometimes found to exist at the same time in the same herd of swine. . . . - D. E. Salmon.

MAD ITCH OF CATTLE AGAIN.—(113) There frequently occurs in the West and other parts, a very destructive disease among cattle, which is known as "mad itch." In vain it has attempted to be traced in the German, French, English and American pathologies. In the description of meningitis and of "grass staggers" (dry murrain), given by Prof. Law, Williams, Gamgee, Roll, etc., some symptoms occurring in the disease may be found. The phenomena of rabies are much in accordance with the symptoms of this disease.

As high as fifty fatal cases have been seen in different localities in a comparatively short time, and word received of its extensive distribution yearly. In Missouri it is very frequent, enzootic and almost always fatal. "Mad itch" is the term used by experienced stockmen of the Western States, and many have had some experience with some disease known by that name, which was given doubtless on account of the furor of the patient and the intense rubbing of the head. Some veterinarians ascribed its cause to so called "dry murrain" (impaction of the omasum) with omasitis; while, others believe it akin to hydrophobia.

From 1885 to 1888 the disease was quite frequent and of a fatal form and rebate to all kinds of curative treatment. In November, 1887, at Huntsville, Randolph county, Missouri, five cattle were found dead of this disease. The first symptoms noticed, though not invariably in several cases, was a slight watery discharge from the eyes, and a rapidly increasing dumpishness. There is always some intense itchiness at some part of the head, which is rubbed and scratched severely on stumps, trees, fences, etc. Usually only one side of the head or only the lower maxilla presents this feature. Rubbing is frequently so constant and hard that it causes considerable irritation of the skin surface. Sometimes even becoming raw and bloody, and the subcutaneous tissues infiltrated with serum and much swollen. Symptoms of nervous excitement appear early and coincide with the rubbing.

GLANDERS DISEASE OF HORSES (114).—*Illinois*: Tuscola reports that glanders has broken out and that the State veterinarian killed several diseased animals. There is considerable alarm in the region of Decatur on account of the prevalence of glanders. Quite a number of horses have been killed and others quarantined. In Dalton City the authorities have ordered all hitching posts taken up and burned.

Minnesota—The State Board of Health reported the destruction of 13 cases.

Maine—From the report of the commissioners on contagious diseases of animals, it appears that glanders and farcy have been increasingly prevalent during 1888. The bringing of Texas horses into Maine was prohibited because glanders was said to be prevalent among them.

HYDROPHOBIA IN WEST VIRGINIA (115).—In Jackson county an epidemic of rabies among cattle broke out and the farmers have lost thousands of dollars worth of fine stock. A dog . . . went mad and before he was killed attacked a number of other dogs, cattle, sheep, swine and poultry on several farms. These animals nearly all went mad, and have since died. More than fifty hogs have been killed. In Ravenswood, in the same county, the mayor has ordered every dog muzzled. Cattle that have died from hydrophobia are lying in the fields, and persons are afraid to eat any meat from that section.

1889 and 1890: PLEURO-PNEUMONIA PRACTICALLY ERADICATED (116).—Secretary of Agriculture J. M. Rusk, in his report to the President for the year 1889, wrote that "the work of the bureau (of animal industry) in the control and eradication of contagious pleuro-pneumonia has been vigorous, and I am happy to state successfully prosecuted."

Dr. D. E. Salmon, Chief of the Bureau of Animal Industry, in his report for 1889, wrote (117): "A feature of great interest in this volume will be found in measures undertaken for the suppression of contagious pleuro-pneumonia as a prevailing disease has practically disappeared from the United States. For many months past but few cases have been discovered, notwithstanding the constant vigilance of a large force of veterinary inspectors. These cases were confined to isolated localities in the immediate vicinity of New York. . . ."

MORE ABOUT MAD ITCH OF CATTLE (118).—Many reports of this peculiar disease of cattle have already been presented to the reader. The following report was made under date of June, 1890, by Dr. Sesco Stewart, a prominent and learned veterinarian of his day:

“The following description of this disease is placed before the readers of the ‘Journal’, hoping that someone has discovered the etiology and pathology of this peculiar malady. . . . Correspondence with several well known members of our profession elicits the fact that many others share the lack of definite notions concerning this disease. . . .

“In western Iowa and eastern Nebraska, and for aught the writer knows, in a much greater territory, this disease develops during, or directly following, severe winter weather, usually affecting but a single herd in any given neighborhood. The general condition of the cattle attacked nor their environment seems to predispose to or influence the malady. So far as the writer’s observations goes, females only are subject to this disease. . . .

“. . . A two year old heifer was observed to switch her tail peculiarly, then soon to rub her nates and stamp her hind feet. The muscles of the gluteal and crural regions jerked in a choreic manner. This condition was soon intensified so that she would frequently lie down, soon to rise again, or sit upon her haunches and slide the parts backward and forward upon the ground, would rub the buttocks against the enclosure with sufficient violence to abrade, and even laebrate the parts rubbed; would stamp the hind feet as though covered with flies which she was determined to dislodge. Posterior muscular paralysis soon followed, and she could not rise. The irritating sensations continued so annoying in her feet and legs that she would roll from side to side, over the sternum, and whip the uppermost limb on the ground, also lick and bite it until it would bleed. Next came contraction of the levator muscles of the head and neck, which brought the head nearly over to the dorsal region. Death ended her suffering in 13 hours. The appetite was lost, but she had power to chew and swallow food, and did so at times, apparently through sheer agony. The power to regurgitate was lost from the beginning of the symptoms; bowels constipated, urine sufficient, thirst limited, respiration hurried, temperature and pulse not taken. Post-mortem examination by the owners, who were practical butchers and close observers, showed mottled lungs, distended bladder, maniplies rather dry, but nothing to attract special attention.” (Note: the above is but a small portion of the original.)

INFECTIOUS ABORTION OF MARES (119).—It has only been during the past 8 or 10 years that it has prevailed extensively in the Mississippi Valley, but in this brief period it has proven a veritable scourge to horse breeders. It first engaged special attention about 1886, gradually increasing in virulence until it reached its climax in 1889-90. . . . In McLean county, Illinois, one of the richest draft horse breeding districts in America, there were reported for the year 1888, 5,000 living foals, and it is quite safe to say that, aside from other causes of loss, not less than one-half as many foal perished from infectious abortion as lived. In several townships. . . the losses from this malady alone reached 75%, while in other less fortunate townships the disease was comparatively rare or unknown. . . . (extract) - W. L. Williams.

NODULAR DISEASES OF SHEEP - A NEW PARASITE (120).—In the Eastern States there exists a hitherto undescribed disease, which is characterized by tumors present in the upper part of the large intestine. The disease causes heavy losses for it seriously affects the health of the sheep and renders the intestines valueless for making sausage casings. Though the latter result would seem trivial at first sight, it is by no means unimportant, for sausage makers are compelled to import the greater part of the covering material used in their business. The disturbances of health produced are very serious, for there are places in the South where sheep cannot be kept with profit, apparently on account of this parasite alone. Dr. D. E. Salmon (Chief of the Bureau of Animal Industry). . . who at one time lived in the South, performed many post-mortem examinations on diseased sheep, and found nothing but these intestinal tumors to account for the severe symptoms of disease which they exhibited, and has verbally stated that he believes that this disease is the chief obstacle to successful sheep husbandry in some portions of the Southern States.

“The cause of the disease remained until 1888-89 in obscurity, but owing to a favorable combination of material and methods of investigation it was then ascertained. Some of the larger soft tumors, which are characteristic of this disease, were dissected from the intestine, and after being split open their greenish, cheesy contents scraped into a watch glass of water. By carefully teasing the apparently newer portion of these masses a little worm, the cause of the trouble was found. Previous to that time Dr. Theobald Smith, of this Bureau (of Animal Industry), had in the winter of 1886-87, made and examined microscopic sections of these tumors. One of a series

of sections showed what was apparently the fragment of a worm. Numerous other sections made at this time showed no signs of the parasite, and the investigations were temporarily abandoned. . . .

"The cause of the disease is a nematode or round worm, which though remarkably similar to some other worms of its group, is nevertheless a distinct species from any hitherto described. . . . The species is distributed in the United States east of the Mississippi River as far north as Maryland, perhaps farther north. . . .

"*Esophagostoma columbianum* Curtice, seems to have become a parasite of sheep since their introduction into this country. If present in the Old World at all it is sparingly so, and seems to have escaped detection. So little is known about its distribution, that it is impossible at present to define its limits. From its great abundance in the Southeastern States one might infer that it had originated as a sheep parasite in that region, and probably from some animal of allied organization and habits. . . . - Cooper Curtice.

FALSE FOOT AND MOUTH DISEASE (121).—A recent circular issued by the State veterinarian of the State of Missouri, which was headed "Foot and Mouth Disease" and which gave a somewhat detailed description of the symptoms of a disease, which has excited considerable comment abroad and has been considered by some veterinary authorities as a demonstration of the existence of that disease; but careful investigation made by one of the inspectors of the Bureau (of Animal Industry) demonstrated that the disease was not a contagious nature. . . . - D. E. Salmon.

1891: REPORT ON SWINE PLAGUE (122).—In 1891 a "Special Report on the Cause and Prevention of Swine Plague" was published at Washington, giving the results of the experiments of Theobald Smith, a scientist of the Bureau of Animal Industry. The following conclusions are listed by Dr. Smith as follows:

1. There are two independent infectious diseases of swine—swine-plague and hog cholera—each caused by an easily recognizable, specific disease germ. (writers note: At a later date hog cholera was definitely proven to be due to a filterable virus.)

2. Swine-plague (in those outbreaks which have come to our notice) is limited chiefly to the lungs in its destructive effect. The intestines may be involved and frequently are involved in the disease process. Hence it is an infectious pneumo-enteritis rather than an infectious pneumonia.

3. There is considerable variation in the virulence or the disease-producing power of swine-plague bacteria from different outbreaks. The greater the virulence, other things being equal, the severer and more extensive the epizootic.

4. Bacteria of Schweineseuche (German disease of swine) are identical with those of swine plague.

5. In the upper air passages of a certain percentage of healthy swine, cattle, dogs and cats, bacteria exist which belong to the species of swine-plague bacteria, and which as a rule possess a relatively feeble virulence. While it is probable that such bacteria may produce disease it may be regarded as pretty certain that it is largely aided by secondary causes producing unthriftiness, and is merely sporadic and not communicable.

6. In many epizootics of swine disease both swine-plague and hog cholera bacteria as well as the respective lesions of these bacteria co-exist. Such mixed disease are due to the frequent presence of both bacteria in the surroundings of swine, probably a result of frequent introduction. Either disease may be primary according to its relative virulence.

7. It is highly probable that the many attenuated varieties of either disease germ can produce disease only when assisted by the other germ or by the unsanitary, unphysiological methods of rearing swine by which the latter are reduced in vitality and made more susceptible.

8. It is pretty well established that there are a number of infectious diseases affecting cattle, buffaloes, deer, fowls and smaller animals, the bacteria of which are closely related, if not identical, with, those of swine-plague. These plagues appear in various parts of the globe sporadically. (Wild und Rinderseuche, barbone buffalino, fowl cholera, rabbit septicemia.) Their tendency to spread from one species to another, from cattle to swine for instance, probably depends both on the degree of virulence of the bacteria as well as the opportunities afforded for such transmission.

9. Swine-plague bacteria are probably introduced into a herd only in the bodies of animals, since they are speedily destroyed in soil and water by natural agencies. Attenuated varieties may be introduced by healthy animals. Since these may under special conditions give rise to disease, efforts to prevent and suppress infection must take into account the physical condition of the exposed animal.

LUMPY JAW (ACTINOMYCOSIS) AT THE CHICAGO STOCK YARDS (123).—Beginning October 15, 1888, the State of Illinois arrested and quarantined actinomycotic cattle at the Union Stock Yards at Chicago, and the National Stock Yards at East St. Louis. Every Saturday the State veterinarian examined all the cattle that had been quarantined during the week and condemned as unfit for food all that were badly diseased. From 1888 until 1893 over 5,000 cattle were condemned for this disease, by the State officials. It was apparent that for several years the commission firms began diverting the traffic of lumpy jaw cattle so as to avoid inspection by the State inspectors, and a suspicion was created that the meat was being smuggled into market after being dressed, in violation of the city ordinance.

On January 3, 1893 the Governor of Illinois, and the Health Commissioner of Chicago, and members of the Board of Live Stock Commissioners gathered in conference and adopted rules to the effect that the State veterinarian or assistant State veterinarian would be notified of all diseased or suspicious animals and also adopted measures to overcome the state of affairs that had previously existed.

1892: CONTAGIOUS PLEURO-PNEUMONIA COMPLETELY ERADICATED (124).—The Secretary of Agriculture J. Rusk, in his report to the President for 1892, wrote:

“This year marks the successful accomplishment of the work undertaken by the Bureau of Animal Industry in 1887 and continued without intermission until the present time, in its struggle to effect the complete eradication from the United States of the disease known as contagious pleuro-pneumonia. It tells a story of what untiring patience and firm determination will accomplish, and it proves to the people of the United States that in spite of all obstacles, oftentimes of unjust criticism, and of virulent opposition in some sections, our officers have succeeded in doing what at the outset was declared by many as an impossible achievement. . . .

“From the introduction of the pleuro-pneumonia in Great Britain up to 1869, England had lost according to reliable estimates, almost exclusively from this disease over 5,500,000 head of cattle worth in round numbers \$400,000,000, and judging from the ravages of the disease in that country since that date, we may put the total losses on a very conservative estimate, at \$500,000,000 in deaths alone. . . .

“In addition to all these losses Great Britain paid out for a period of 7 years expiring with 1890 the sum of \$1,624,736 for cattle condemned and killed on account of this disease; and yet . . . there would seem to be a very general opinion existing throughout Great Britain that eradication is hopeless. . . . Taking these figures, as a basis comparison, the cost of the work in the eradication in the United States has been very moderate. The total expenses, including the purchase of diseased and exposed animals, together with all salaries and traveling expenses and the various miscellaneous expenses . . . have amounted to but \$1,509,100, being in round numbers \$115,000 less than the bare cost of the cattle killed in Great Britain. . . .”

TUBERCULOSIS OF CATTLE - THE TUBERCULIN TEST (125).—In January 1891, Professor Gutman of the Veterinary Institute of Dorpat, Russia, employed tuberculin on cattle and found that the results were quite similar to those obtained in man. That is, there was a temperature reaction in tuberculosis cattle and none in other cattle. The substance has since been used in every civilized land, and the reports are almost uniformly favorable.

Tuberculin was first used in America experimentally on animals by the so-called tuberculosis commission of the veterinary department of the University of Pennsylvania. The following quotation is a description of the first practical use of tuberculin on cattle as a diagnostic agent in America. The test was applied during March of 1891, by Leonard Pearson, a veterinarian connected with the University of Pennsylvania.

“It (tuberculin) was first used in this country practically on cattle of the fine herd owned by Mr. Gillingham (of Pennsylvania), and in which he takes so keen and just a pride. After inoculation of the whole herd, sixty-six, developed those symptoms which, if the drug be true, indicated the presence in the animal of that dread disease tuberculosis. Here was a prospect before which the stoutest hearts might shrink, and be led to falter with the temptation of ignoring the putative tests of an unknown drug, and of saving the animals until they could be respectfully sold. But Mr. Gillingham never flinched a hair, but all sixty-six were incontinently slaughtered, having the diagnosis confirmed in each case at the post-mortem. It is impossible to calculate how far-spreading was the circle of disease which by this heroic action was at once stamped out. The moral, by the way, which this incident, so tragic and so honorable . . . points out is the exceeding great need of subjecting, as Dr. Shakespeare suggests, all dairy cattle to this test for tuberculosis. . . .” (126)

PREVENTION OF TEXAS FEVER - A GREAT ECONOMIC FACTOR (127).—Secretary of Agriculture J. M. Rusk, in his report for 1892, wrote:

“By the regulations imposed by the Department (of Agriculture) for the prevention of Texas fever this disease has been almost entirely prevented. Not only have our regulations guarded against direct losses from the cattle, and have they greatly facilitated the transportation of cattle, and have been the principal factor in securing a reduction in insurance rates, by which \$5 have been saved in that item alone in every steer exported. In a word, I may say advisedly that *the regulations for the prevention of Texas fever have saved three times as much money to the cattle growers of this country yearly as is required to run the whole Department of Agriculture.*” (Writer’s note: Underlining added.)

THE ETIOLOGY OF TEXAS FEVER ESTABLISHED (128).—During 1893 the Bureau of Animal Industry issued a 300-page book entitled “Investigations into the Nature, Causation, and Prevention of Texas or Southern Cattle Fever”, prepared under the direction of D. E. Salmon, Chief of the Bureau, by Theobald Smith and F. L. Kilborne (128). The experiments were made during the years 1889 to 1892, and the findings of Smith and Kilborne were phenomenal. A portion of Salmon’s comments on the report are as follows:

“In the whole list of diseases affecting the domesticated animals, there is none so peculiar in its character or so mysterious in its phenomena as was this one previous to these researches. The dissemination of the deadly contagion by apparently healthy cattle, and the harmlessness in general of the really sick animals were inexplicable by any facts which were furnished by the study of other diseases. Veterinarians who had not had an opportunity to observe this disease were skeptical in regard to the correctness of such conclusions, and some spoke of them as a “romane in pathology.” These early observations have not only been confirmed, but the phenomena have been explained, and our knowledge placed upon a scientific basis.

“It had long been believed by the cattle growers of the West that Texas fever was caused by the ticks which were carried and scattered everywhere by the Southern cattle; but scientists were incredulous, because they could not understand how the bite of these insects could produce such an acute disease, with destruction of the blood corpuscles and lesions of internal organs. It was not until the protozoal micro-organism (*Pyrosoma bigeminum*) was discovered in the blood corpuscles, and its destructive effects were revealed, that the action of the ticks could be explained.

“When the writer (D. E. Salmon) investigated the extent of the infected district he was strongly impressed with the fact, which then became apparent, that this district almost exactly corresponded with the habitat of the suspected tick. This led to the experiments that demonstrated that ticks carried the infection, introduced it into the tissues of susceptible cattle, and in that way produced the disease. We have to deal, therefore, with a complicated infection, in which two very different kinds of parasites play an important part.

“Another significant discovery, no less marvelous, is that the micro-organism which constitutes the contagion of the disease is transmitted through the egg to the young tick, and it is this and not the adult tick carried by the Southern cattle, which finds its way upon susceptible animals and causes the disease. In the absence of the tick the disease is probably not communicable except by artificial inoculation.”

Smith apparently first observed the parasite of Texas fever “in the spleen of a case from an outbreak in Virginia, September, 1886,” and “in the organs of cases from an outbreak in Maryland, September, 1888,” and on many occasions thereafter (129).

DOURINE IN THE WEST (130).—During 1892 the National Bureau of Animal Industry was informed of a disease affecting breeding horses in northwestern Nebraska, which had the general characteristics of mal-du-coit (dourine). Dr. Geo. C. Faville, a veterinarian of the Bureau, was detailed to make an investigation, and after examining a considerable number of animals reported that this disease existed there and that probably 200 horses were infected.

No steps were taken for the eradication of the malady until June 12, 1893, when Dr. Faville was again ordered to Nebraska with instructions from the Secretary of Agriculture to cooperate with Mr. E. Sheldon, agent of the Bureau, for the purchase and destruction of all affected animals. It was found that a large number of the diseased animals discovered by the investigation of 1892 had since died, the horse owners of the infected section had taken precautions which had to a large extent prevented the further dissemination of the contagion. Thirty two diseased animals were found in Nebraska and 5 in South Dakota. These were all purchased and killed.

1893: ANTHRAX IN ILLINOIS (131).—In the latter part of July 1893, the attention of live stock commissioners of the live stock commission of Illinois was called to the prevalence of a disease which was rapidly carrying off the live stock of Edwards, Wayne, and Clay counties, in the southern part of that state. . . . The disease was so widespread and fatal that this Department (of Agriculture) directed V. A. Noogard, an inspector of the Bureau of Animal Industry, to visit the locality and make an investigation as to the cause of the outbreak. . . . The following is a copy of Dr. Noogard's report (in part), which was submitted August, 1893.

"In Wayne county, Illinois, the little Wabash River winds through the low, marshy, wooded lands, and the river bottom affords in hot, dry summers when the water becomes very low, a splendid opportunity for the development of micro-organisms. . . . Every summer of late a limited number of cattle have died in this neighborhood from a disease unknown to laymen, but which from the description of the symptoms given must have been anthrax. The farmers, not being aware of danger, left the animals lying around unburied to be eaten by buzzards and dogs. One case noted is very characteristic. One day a farmer found one of his largest working steers dead, though the animal had been apparently healthy a few hours previous. Being very busy he left the carcass lying there in the pasture for several days, and then hauled it over to a small meadow and buried it. The same day several other head of cattle were taken sick, showing swellings on the body or suddenly dropping dead. In this way he lost a number of cattle, 15 or 20, and perceiving the danger he burned the carcasses. The following winter he kept a number of sheep in the enclosure where he had buried the first steer. The rain caused the earth, which had been thrown loosely on the carcass, to sink and a pool was formed from which the sheep drank. Consequently they all died.

"The following year a large number of cattle died in the neighborhood, and some of the carcasses were thrown in the river. In that way the disease spread rapidly, until it acquired such dimensions as to cause the State authorities to take the matter in hand. The unusually long drought this summer has caused the river to fall back very low, so low, in fact, that in many places there are only stagnant pools left, and the result is that in Wayne and adjoining counties between 1500 and 2000 head of horses, cattle, sheep and swine have perished from anthrax. Not until late in the season did the State authorities succeed in persuading a number of the farmers to destroy the carcasses of the dead animals by burning them; but many of them refused to do so, especially those who had lost all their stock and therefore concluded that there was nothing to be gained by cremating the carcasses. The State Board of Health, therefore, appointed a number of supervisors whose duty it was to keep track of all dead and diseased animals, and see that the latter were burned. It was also resolved to impose a fine of \$100 on anyone who did not dispose of the carcasses in the prescribed manner. . . ."

1893: BLACKHEAD DISEASE OF TURKEYS (172).—It was reported to the Bureau (of Animal Industry) in the fall of 1893 that infectious enteritis (blackhead) was destroying many turkeys in New England. In some sections the disease had become so prevalent and destructive that turkey raising was being discontinued. Dr. Smith began an investigation of the disease that led to the discovery by him in 1894 of a minute parasite in the internal organs of the affected turkeys, which he demonstrated to be the cause of the disease, and named it *Amoeba meleagridis*.—U. G. Houck.

1895: REPORT OF THE U.S.V.M.A. COMMITTEE ON DISEASES (132).—The United States Veterinary Medical Association had for many years devoted much of its time to the accumulation of knowledge concerning diseases of domesticated animals. The report of the committee on diseases for the year 1895 is particularly interesting. M. R. Trumbower, chairman of the committee sent out over 200 circulars to prominent veterinarians and other individuals "requesting information regarding contagious and infectious diseases." The following is an abstract of the original report.

Alabama—Dr. C. C. Carey of Auburn, writes as follows: "I wish to say that a number of veterinarians and other have written extensively upon bursatite, the Indian disease, as occurring extensively in the United States, and call upon its discoverers to prove its existence. . . ."

California—Dr. R. A. Archibald, of Sacramento, furnishes us with the following brief report: "Anthrax, tuberculosis and glanders are very prevalent in this State, more especially anthrax, which exists in the form of splenic apoplexy. The last named disease destroys an enormous amount of livestock yearly in the central and southern

portions of the State. It has one peculiarity, inasmuch as it appears in a more benign form than it has done in the Eastern States. One or two veterinarians have commenced vaccination, but I am unable to say at this time with what success."

Colorado—Dr. Charles Gresswell, of Denver, reports as follows: "With respect to the prevalence of tuberculosis among the dairy and breeding herds, I have to state that only one case has been reported and proven by the tuberculin test to be this disease during the year. It is quite true that we have not as yet, thoroughly examined all the dairy herds of the State. . . .

"Glanders . . . has existed in the State during 1893 and 1894; twelve in 1893 and seven in 1894, but all the cases have resulted from an importation from St. Louis some few years ago. Very many cases of catarrh, simple and malignant, assume a chronic form in this altitude, which has many of the characteristics of glanders, and we believe in the past a great many of such cases have been wrongly condemned for glanders. . . .

"Except among the garbage fed hogs near our large cities, until last year we have had very little cholera, but last year, owing to the drought in Kansas and Nebraska, a great many store hogs were brought from these States into Colorado, and brought with them the disease to a large extent, and I am afraid we have now several localities more or less permanently affected. . . .

"We endorse Pasteur's system of preventive inoculation for anthrax and anthracoid diseases.

"Spasma glottidis is a disease peculiar to the Rocky Mountain region, and is characterized by great difficulty of breathing on exertion. It finally causes total asphyxia and total collapse of the animal if urged into a gallop. It is due to nervous contraction of the muscles of the larynx - which gradually increases in severity, and causes death of the animal in from one to six months after an attack. It is confined almost exclusively to range horses, and to special localities. Six outbreaks have come to my knowledge in the State during the past two years, with the loss of about 250 head of horses.

"The loss from sheep scab is serious Losses from poisonous weeds and grasses on the open range are unavoidable. . . . Such poisons are not as a rule eaten by animals unless the natural food is scarce. . . ."

Delaware—Dr. H. D. Eves, of Wilmington, writes as follows: "You are well aware of the fact that our State of Delaware is extremely small compared with our sister States, but we are at present well represented with diseases. We have dreaded Southern or Texas fever. . . and with the last two or three years have been troubled with a slight outbreak. Glanders within the last year have caused more or less trouble in our city and some of the adjacent townships. . . .

"Cerebrospinal meningitis (so-called) is prevalent throughout the State. I can safely say that hundreds of horses die yearly. . . .

"Tetanus prevails, but the number of cases yearly have been greatly reduced due to the advice of veterinarians.

"Tuberculosis is alarmingly present in the northern part of the State, especially within twenty miles of Wilmington. A great many cows have been tested with tuberculin, and we have found in a few herds as many as 75% diseased.

"We have had several outbreaks of anthrax during the last few years, and at present the disease exists in the salt meadows bordering the Delaware Bay, about 20 to 30 miles south of Wilmington. Some farms on which the disease exists have lost almost their entire herd. . . .

"Rabies have been causing a great amount of trouble among dogs, cattle and human beings as well. At least 15 or 29 persons have been sent to Pasteur institute for treatment. . . ."

North Dakota—Louis C. L. Moore, V.M.D., of Jamestown, contributes the following report: "Glanders in horses is our chief and most destructive malady. It is quite prevalent, and while at times it seems to diminish it will break out again with new vigor and be as prevalent as ever.

"Tuberculosis in dairy herds does not exist at all to my knowledge. . . . Blackleg exists this year on the bottom lands of the Missouri River. . . ."

South Dakota—Report from Dr. G. W. Palmer, Lennox: "The principle disease to contend with in this State is glanders. . . . My attention has been called to only one herd of bovines that were afflicted with tuberculosis. . . . The disease comes to this State from Iowa. Our native cattle are free from disease except lumpy-jaw, and a few cases of blackleg in the spring and fall of the year."

Iowa—. . . Dr. W. B. Niles, of Ames, writes: "No disease has been unusually prevalent. Swine diseases have, however, occurred in this region than is usually the case. I have studied an outbreak of swine disease which proved to be swine-plague, in May and June. The government remedy did no good. The most serious disease in the State at

present is tuberculosis. . . . The tuberculin test has revealed it in many herds that have been supposed free from it. . . ."

Illinois—In my report (M. R. Trumbower) of the diseases that came under my observation last year. . . .

"In speaking of glanders during the past year we destroyed 143 horses and mules. . . . Of this number 32 of the cases were discovered in three of the street car barns in the city of Chicago. . . ."

"Cerebrospinal meningitis—in the past year I have found this disease existing in two different stables. In one of these six out of seven died and in the other four, all the horses the owner possessed. . . ."

"Spasms of the larynx—this occurred on one farm last year, the owner losing five horses in about six hours. The cause was entirely, obscure. . . ."

"Texas fever—Four cattle died last fall with Texas fever that were infected by some Southern cattle that broke out of a car on the railroad track. . . ."

"Intestinal worms—the disease caused by the *Strongylus tetracanthus* and the *Strongylus armatus* seems to be increasing in this State year by year. Last fall and winter there were probably 200 deaths that have been reported to me caused by these parasites. . . ."

"Actinomycosis—. . . I have received numerous reports of isolated cases throughout the State. . . ."

"Hog cholera—developed in many counties last fall in this State. In many instances it is attributed to swine from Nebraska and other drought stricken areas. . . ."

Kansas—. . . Dr. S. L. Hunter, of Fort Leavenworth, contributes the following: ". . . glanders and farcy prevail in this locality notwithstanding the efforts of the State to stamp it out. . . ."

Louisiana—Dr. W. H. Dalrymple, of Baton Rouge, reports as follows: ". . . The only diseases which trouble us are anthrax and glanders. The former principally among mules on the sugar sections of the Mississippi bottoms. . . . Glanders, in every section that I have attended, I have succeeded in tracing to other animals imported from other States. . . ."

Maryland—Wm. Doughtery, of Baltimore, briefly states: "There has been very little sickness here this year, principally sore throat in various forms."

Massachusetts—Dr. John M. Parker, of Haverhill, contributes the following report: "In this part of the State we have had only the usual run of the usual diseases seen in country practice. Catarrhal fever has, possibly, been a little more prevalent than usual. . . ."

"Under the recent enactment of Legislature . . . the State Board of Cattle Commissioners have been actively engaged in the detection and eradication of tuberculous animals; they have met with much opposition and bitter criticism. . . ."

Michigan—H. H. Hinds, president of the live stock sanitary commission of Stanton, writes: "We can make no estimate as to the percentage of tuberculous animals in this State. . . ."

"Glanders and farcy—continue to exist among the horses - this commission has been able to drive these diseases from the agricultural districts. . . ."

"Hog cholera and swine plague—There has been a large number of outbreaks of what is called "hog cholera" in different sections of the State during the past two years, and farmers have sustained large losses from disease. . . ."

Missouri—Dr. John S. Meyers, of St. Joseph, submits the following report: "We have had a very heavy outbreak of hog cholera and swine plague in northeastern Missouri for the last three months. Also one very violent outbreak of anthrax in swine the first of July, 1895. . . . We have some actinomycosis, tuberculosis and glanders here, but nothing of importance. In the treatment of hog cholera and swine plague the United States hog cholera and swine plague treatment was used. Results not very satisfactory."

I take pleasure in introducing a very interesting report from Dr. Junius H. Wattles, of Kansas City. I have many reports of this type of disease from various veterinarians in several States:

"Kansas City was visited by an epidemic, beginning about the middle of March this year, and lasting until the latter part of May, affecting horses of all breeds and ages, of a catarrhal nature and very seldom fatal. Not less than 25% of all the horses in the city were affected. . . . Usually the first symptoms noticed would be that of lachrymation, eyelids edematous, loss of appetite, listlessness, head hanging low, recumbent when in stable with general debility. . . . The complications were such as may be expected in any debilitating disease, viz., edema of the extremities, purpura, and general prostration. . . ."

Montana—Dr. W. L. Williams of Bozeman presents the following interesting contribution: ". . . During the present year my attention has been called to an outbreak of a disease in sheep described by Prof. V. Babes, bucaresc ascaricehe, and by Prof. Dr. Bonome of Padua, as parasitic ictero-haematuria, occurring in the Deer Lodge Valley,

where in a territory ten or twelve miles wide by 21 or 25 miles long, there has been for five years an average annual loss of nearly 2,000 sheep from this cause. I have not seen it elsewhere in the State, nor do I know of its occurrence in other parts of the United States.

“... I have also observed a wide prevalence of the *Cytodites nudus* parasite of fowls, which has caused serious losses in the Gallatin Valley among chickens and turkeys. . . so far as I know it has not been reported heretofore in America.”

New Hampshire—The Cattle Commissioners' Report, January 1, 1894, states that during 1893, 115 cattle have been condemned for tuberculosis. . . and 19 horses destroyed for glanders.”

New Jersey—Mr. Franklin Dye, the secretary of the commission on tuberculosis in animals, writes as follows: “. . . There have been a number of cases of glanders as in other years, but not great percentage. Tuberculosis exists but not in general. . . .”

New York—Dr. John Faust, of Poughkeepsie. . . forwarded the following communication: “. . . There is at present an epidemic of glanders in Long Island City.”

Dr. D. K. Kinsman, of the livestock sanitary board, addressed to me the following: “Glanders, hog cholera, and a few cases of pneumonia among cattle have been reported. A quite extensive outbreak of hydrophobia prevailed among hogs, dogs, and cattle during the spring and early summer. . . .”

Pennsylvania—Dr. James A. Waugh, of Allegheny City, writes: “Influenza prevailed among the horses as usual with many fatalities among green and shipped horses. I have seen tuberculosis in cattle. . . . Hog and poultry cholera prevail in some localities. Actinomycosis is rarely seen in this section. . . . Dr. Otto Noack, of Reading, reports an extensive prevalence of laryngo-pharyngitis acuta. . . .”

Virginia—. . . Dr. E. P. Niles, of Blacksburg, reports as follows: “The most interesting disease reported was epizootic pharyngitis, which prevailed in the cities of Richmond, Norfolk and Charlottesville. The fatalities were light. . . . Tuberculosis is prevalent in most dairy herds of this State. . . . Texas cattle fever exists along the border line to a considerable extent each year. Glanders exists to a slight degree. . . .”

Washington—Dr. S. B. Nelson, of Spokane, sent the following: (Nelson reported that he had observed glanders and tuberculosis and mentioned his investigation of an outbreak of anthrax on milch cows.)

West Virginia—Report of Dr. Wm. Tetrle, of Wheeling: “. . . the diseases most frequently mentioned are distemper in horses and parturient apoplexy in cows. These two maladies cause great losses every year. . . . Tuberculosis is common in most dairies.”

Wyoming—Dr. A. A. Holcombe, of Cheyenne, reports during the last year, four cases of glanders, two outbreaks of tuberculosis. . . .

Wisconsin—Dr. J. L. Scott, of Beaver Dam, writes: (Scott reported that he had observed glanders and actinomycosis and mentioned the loss of about 200 head of livestock from anthrax in the region around Green Bay.) “Hog cholera prevalent in the northeast in the spring. . . .”

New Mexico—Mr. J. A. La Rue, secretary of the cattle sanitary board. . . .: “Except for the ten cases of tuberculosis in a Jersey herd no contagious diseases reported in New Mexico since a herd of Texas cattle left fever in their trail ten years ago.”

1895: FOWL TYPHOID - A COMMON DISEASE (172).—In 1895 a description was given of a disease of fowls which no doubt had frequently been mistaken for cholera. The disease was called infectious leukemia and its causative agent *Bacterium sanguinarium*. This disease is now known as fowl typhoid and is one of our most common poultry diseases. - U. G. Houck. 1924.

BOVINE TUBERCULOSIS A NEW ISSUE (133).—By 1895 a mass of literature had accumulated concerning bovine tuberculosis. The following extract from the American Veterinary Review of March, 1895, well illustrates the state of affairs:

“Our agricultural papers are in their various issues repeatedly treating on the subject; veterinarians are making experiments and familiarizing themselves with the tuberculin test; legislatures in the various States are passing or requested to enact laws relating to tuberculosis; applications for official veterinary appointments are pouring in before those who hold the power to appoint. . . . It is the repetition of the excitement which prevailed when the stamping out of pleuro-pneumonia was inaugurated a few years ago.”

EARLY EFFORTS AT TUBERCULOSIS ERADICATION (134).—A. Liatard, in the Review for December, 1894, relates the following: "When we were in Philadelphia last September (the meeting of the United States Veterinary Medical Association), during our short stay, we had an opportunity to ask at random of Dr. D. E. Salmon (Chief of the Bureau of Animal Industry) if the Bureau was soon going to begin the stamping out of tuberculosis. . . . He answered by a smile—the smile of his which we all know so well—and tells so much when the doctor wishes to tell so little—and we were free to think that the Bureau was not quite ready to enter into that enormous undertaking. . . ."

Massachusetts was apparently the first State to enact legislation whereby the stamping out of tuberculosis, by means of the tuberculin test, was attempted. By 1895 the Massachusetts Board of Cattle Commissioners had devised and inaugurated a system with the "lofty object of detecting, controlling, and probably eradicating tuberculosis. . . . by the aid of tuberculin, quarantine, and slaughter." During 1895 and 1896 the legislature of Massachusetts enacted laws by which the Board of Cattle Commissioners were deprived of most of their power to carry on the work of eradication as they had previously planned. Cattle could not be tuberculin tested by the Board without the written consent of the owner, and cattle owners even had the right to prevent the Board from detecting and destroying diseased cattle.

During 1897 the legislature of Massachusetts adopted an order giving authority to form a committee of experts to assist in the tuberculin testing of cattle. Theobald Smith, F. S. Billings, Charles R. Wood, and others were on the committee. After considerable testing Billings and Wood, in their report, expressed their doubt as to the reliability of the test. Theobald Smith, on the other hand, in his report, by noting post mortem results regarded the test as phenomenal. Smith was sustained by other members of the committee.

1897: CATTLE TICK ERADICATION - EARLY EXPERIMENTS (136).—The first dipping vat to be built in this country was constructed by Mr. R. J. Kleberg, manager of the Santa Gertrudes ranch, in Nueces county, Texas, who used it for treating his stock for mange and itch. For this purpose the cattle were dipped in a strong solution of carbolic acid, and it was soon noticed that a large number of the ticks which infested the cattle became severely affected by the dip. Mr. Kleberg then placed his dipping vat and also his ticky cattle at the disposal of the Bureau of Animal Industry, and during the following five years, with the object of testing the tick destroying properties of various disinfecting preparations, there were dipped at this ranch more than 25,000 cattle. The important fact was learned from these experiments that the ticks were better able to resist the efforts of these preparations than the cattle. When the solution was strong enough to destroy all the ticks it injured the cattle, and when sufficiently diluted not to irritate the skin and eyes of the cattle the ticks would survive. As an instance showing the resistance of the tick to strong disinfectants, it may be mentioned that a solution of corrosive sublimate in water (1 to 250) does not in the least effect the tick when left in it for several minutes. The same is true of carbolic acid, arsenic, lime and sulphur, and a great number of proprietary sheep dips.

Tick Eradication and Texas Fever—It was important to the cattle owners of the tick infested areas that a method of tick eradication or control be developed for two important reasons. Firstly, that the tick had been incriminated as the transmitter of the germ that produced Texas fever in susceptible cattle, and, secondly, that "ticky cattle" as a rule were unthrifty, and under quarantine restrictions.

As early as 1889 Dr. D. E. Salmon (Chief of the Bureau of Animal Industry) demonstrated that the district from which cattle carried the contagion of Texas fever was identical with the territory in which the cattle tick was found, and although it was not until a few years later that the true relationship between the tick and Texas fever was finally established, a precautionary measure against the spread of the disease was taken in the form of a rigid quarantine, which excluded all cattle of the Southern tick infected country from the uninfected district, where cattle were known to contract the fever and die when they came in contact with Southern cattle. As experience had proven that during cold weather the danger of infection was greatly diminished, if not entirely eliminated, the quarantine regulations were suspended during the coldest part of the season, that is from December to February 15th. This period, the so-called open season, was later changed to November 1 to December 31, during which time all cattle were allowed to pass into the uninfected territory without any restrictions whatsoever. During the remaining ten months, however, cattle from below the quarantine line could only be shipped north of it when intended for immediate slaughter, and rigid precautions were taken to prevent the spread of the disease from such animals. . . . (136)

The Oil Bath—Dr. M. Francis, of the Texas Agricultural Experimental Station, was the first to suggest the use of an oil dip. It is common experience that any kind of grease or oil will destroy the tick when applied to cattle infested with these parasites. Dr. Francis suggested the use of crude cotton-seed oil. A layer of two or three inches was floated on water, which filled the dipping vat to a depth of about five feet. When cattle were immersed in such a bath they would, as a rule, come out well covered with oil, but it was soon found that many ticks survived the dipping, even when 10 to 15% of crude carbolic acid was added to the oil. Besides this drawback, the oil had a very heating effect on the cattle, especially during the hot summer months. Nevertheless the oil was a step in the right direction and various kinds of oil and oil emulsions with soap and carbolic acid were tested at the Santa Gertrude's ranch; but none of them proved satisfactory.

During 1897 and 1898 numerous dipping experiments were conducted at Santa Gertrude's ranch and at Fort Worth, Texas. Great interest was being taken in the dipping question and stockmen everywhere began to realize that it would be of great economic importance if a satisfactory dip could be discovered. During August, 1897, experiments at Fort Worth were given wide publicity through the press and attracted considerable attention. During September, 1897, a convention was held at Fort Worth, with delegates from many states attending the dipping experiments. During 1898 the scale of the experiments were increased with rather good results being arrived at.

Removal of Restrictions for Dipped Cattle—In order to make it possible to transport dipped cattle across the quarantine line, an order was issued by the Bureau of Animal Industry, under date of October 12, 1898, as follows: "It is hereby ordered that cattle originating in this district . . . known as the quarantine district, may after having been properly dipped, under the supervision of an inspector of this Department, in a solution of 86 pounds of sulphur to each 1,000 gallons of extra dynamo oil, be shipped without further restrictions (with certain provisions). . . ."

Several dipping plants were built and put in operation without awaiting the sanction of the Government; but a number of casualties which occurred among several lots of dipped cattle, greatly exaggerated by press reports, very soon cooled the ardor of those who wished to establish dipping plants for speculative purposes. . . .

In Oklahoma and Indian Territory several dipping vats were built, and during October, November, and December, 1898, about 10,000 head were dipped in oil and sulphur, the estimated loss being a little more than 1% confined entirely to cattle in a poor condition. . . . (136)

(Writer's note: While most of the preceding information on cattle tick dipping experiments, etc., is directly quoted from an article by V. A. Norgaard, some of the original has been greatly reduced in detail.)

A SERUM FOR SWINE PLAGUE AND HOG CHOLERA (137).—. . . In the year 1890 a study of the substances secreted by the hog cholera and swine plague germs was begun in the Biochemic Laboratories of the Bureau of Animal Industry by the writer of this article (E. A. De Schweinitz). From the cultures of these bacteria he succeeded in isolating two substances albuminoid in character and others belonging to the group called amines, which produced, when injected into experimental animals, some of the characteristic symptoms of hog cholera or swine plague, respectively, and conferred upon these animals an immunity to subcutaneous inoculation with hog cholera and swine plague germs. . . .

Work in Page County, Iowa, in 1897—The Secretary of Agriculture requested the Governor of Iowa to designate a county of the State of Iowa in which he would like to have experimental work carried on by the Bureau of Animal Industry. The governor selected Page county. . . . The work in Page county was in direct charge of Dr. Marion Dorset. . . .

In order to note the efficiency of field work of this sort, it is very important that a large number of checks should be preserved. To accomplish this, in some instances a portion of the treated herd was reserved and not given serum. In other instances herds in which disease existed of about the same virulence as that in the treated herds were left as checks. . . .

Field Work in 1897—. . . out of 196 animals treated with the mixed serums 161 were saved, or about 82%. The disease existed on all the farms where treatment was carried out, a number of animals had already died, and about 50% of the animals treated were ill at the time of injection with the serum. In the check herd there were originally 429 animals, and the disease had begun both in these check herds and in the treated herds about the same. In the herds which were not treated only about 15% of the animals recovered. Comparing these two sets it would appear that the serum had reduced the mortality about 67%. It is understood, of course, that all of the animals were under the same conditions after treatment as before. . . .

Field Work in 1898—Dr. Mc Birney, in the same county (Page) carried out the use of the mixed serums on a larger scale and together with check herds confirmed the results of Dorset . . . leaves apparently but little doubt as to the efficacy of practical treatment of swine diseases in the field by the use of these mixed serums alone or with bacterial products, combined with simple methods of disinfection and slight care which every farmer should be willing to give to his animals. . . .”

CORN STALK DISEASE (138).—Corn stalk disease is an affection which has prevailed extensively in the corn growing districts of the West, and particularly in Iowa, Nebraska, and Kansas, for a number of years, but very few outbreaks have been reported from the Eastern States, and, so far as I know, the disease has not been recognized in Pennsylvania until the present season. During the past few months several outbreaks of disease among cattle have been reported and investigated (in Pennsylvania) that were characterized by the following features: excitability, abdominal pain, disinclination to move, constipation, weakness, paralysis and death. In every instance thus far it has been possible to determine that cattle thus afflicted were fed on cornstocks that were in a mouldy condition. In one outbreak that I looked into recently in Lebanon county (Pennsylvania) it was found that six cattle had died. During the day they had been kept in a yard that was littered with corn fodder from a stack in an adjoining field. The fodder was very mouldy and the stalks were thickly coated with a grayish mould near the base of the leaf. The yard was cleaned up and the use of this fodder discontinued, since which time there has been no recurrence of the disease. - L. Pearson.

ABORTION OF COWS (138).—Abortion of cows is a disease that has occasioned great losses in many parts of the State (Pennsylvania) and particularly in the dairy districts. Many cases have been reported in which it recurs in herds from year to year, so that the profit from the herd is entirely destroyed and in some instances the losses that result from this cause are ruinous. . . . So long as the cause of this disease remains unknown all measures directed against it are like fighting an enemy in ambush, but as soon as the cause is discovered and its characteristics made known the sanitarian has decidedly the best of the contest. . . . L. Pearson.

OSTEO-POROSIS - BIG HEAD (138).—Osteo-porosis has prevailed to an alarming extent (in Pennsylvania), or at least a large number of cases have been brought to my attention, during the past year. It may be, however, that the increase is more apparent than real, but it is evident that a large number of horses is incapacitated from this cause and a number of vague and indefinite lamenesses result from this disease. The cause of osteo-porosis is still undetermined, and until we have more information on this point all attempts to cure or prevent will be purely empirical and probably to a large extent unsuccessful. - L. Pearson.

HOG CHOLERA.—Hog cholera has prevailed extensively all over the United States during the past season. It is estimated that the loss in Iowa resulting from this disease alone to more than \$10,000,000 during the past twelve months, and, while other states have not suffered so excessively, they have likewise lost extensively. . . . (138)

INTERESTING COMMENTS ABOUT RABIES (138).—The investigation of rabies made under the direction of the Live Stock Sanitary Board (of Pennsylvania) have included visits and inspection in the districts in which the disease has appeared, the tracing of animals reported as rabid and animals bitten by them, the inoculation of rabbits from the brains of dogs and other animals reported as rabid and the quarantining and destruction of dogs and cattle in the acute stages of rabies, and when they have been bitten by a dog that was undoubtedly afflicted with the disease. These investigations have demonstrated conclusively that rabies actually exists, and during the past season to a quite alarming extent among the domesticated animals of this State (Pennsylvania). It has been remarked that some outbreaks of the disease are of an excessively virulent and others of a comparatively mild nature; that is, some dogs produce rabies in nearly every animal bitten by them, while others produce rabies in a comparatively small proportion of the animals bitten and sometimes the disease appears in the paralytic or dumb form. Variations in the strength of the virus of this disease have been studied for a long time and have been produced artificially in laboratories, and it has been observed that under certain conditions the disease becomes progressively milder until finally the virus loses its virulence to such a degree that it will not produce the characteristic symptoms of the disease, but by passing this attenuated virus through an animal of a different species its virulence can be restored, and it is suggested that rabies of dogs always has a tendency to become milder with each successive generation, and unless another animal, a cat for instance, is bitten and in turn bites a dog, thus propagating the disease, it will in turn

become practically harmless. There are some places where rabies is stationary and cases among dogs are of frequent occurrence, but of such a mild type as to cause little apprehension. But occasionally a dog in the furious stage will appear and bite animals or people and cause much alarm in a large territory, and a number of cases of rabies often follow a raid of this sort. While all undue excitement should be avoided, it appears that there is no good purpose to be accomplished by hiding the facts connected with this disease, but it should be explained fully and freely that the existence of rabies constitutes a serious menace to communities in which it exists, but that all dogs that have fits, become excited, or bite, are not mad, and that rabies is a comparatively rare disease, the diagnosis of which is attended with some difficulty. - L. Pearson.

ANTHRAX IN THE LOWER MISSISSIPPI VALLEY (139).—It is significant that reliable evidence exists that anthrax prevailed in several localities of the lower Mississippi Valley at an early period, and has appeared locally at irregular intervals ever since. In 1836 a disease known as "choking quinsey" prevailed in several counties of the swamp region of the State of Mississippi. The symptoms as described indicate that the disease was none other than true anthrax. In 1865 many cases were again reported from the same region, and in the spring of 1867; a season that was marked by unusually severe drouth, an epidemic of anthrax set in, from which it is said scarcely a mule escaped and 90% of those affected died; years elapsed before the planters recovered from their losses. Since 1867 the disease has prevailed more or less in the same localities, and the years 1875, 1876, 1881, 1882 and 1889 were marked by light epidemics. In the northern part of the neighboring State of Louisiana the disease seems likewise to have prevailed for a considerable period, and in the scant literature upon the subject occasional reference is made to local outbreaks of anthrax there, or of a strikingly similar disease for a period covering almost half a century. . . .

During the spring and summer of 1896 there prevailed in the northern part of the State of Louisiana and a few of the adjoining counties of Mississippi and Arkansas an exceptionally widespread and fatal epizootic of anthrax, or, as the disease is named by French speaking people, charbon. In the extent of country infected, and in the number of animals attacked, this outbreak of anthrax is unprecedented in the scant history of the disease as it has appeared in the United States.

. . . Louisiana suffered by far the most severly, not only as to the extent of the territory infected, but also as to the virulence of the plague. In that State several thousand of horses, mules, cattle and hogs were attacked, and in some parishes a heavy percentage of them died. A few instances also occurred of its communication to man. In some localities a veritable panic prevailed. The loss of large numbers of farm animals, at a season when the crops were being made and harvested, seriously crippled agricultural operations, and the irreparable losses by small farms of their entire animal power deprived many of them of the very necessities of life.

In Mississippi and Arkansas the infected territory comprised a much smaller area than Louisiana, and the epidemic assumed in those States a much less sweeping and virulent form. . . .

ENZOOTIC CEREBRO-SPINAL MENINGITIS OF HORSES (140).—During 1896 Dr. W. L. Williams, as a special agent of the Bureau of Animal Industry, was ordered to Idaho Falls, Idaho, to investigate a disease among the horses of that region. A portion of his report is given as follows:

"My investigations of the disease in horses resulted as follows: The malady has been known in the Snake River Valley, in the vicinity of Idaho Falls, for about three years; it prevails chiefly, but not wholly, on the east side of the river near the foothills, along a small tributary of the Snake River, called Willow Creek. . . . The diagnosis of . . . three cases showed the animals to be affected with enzootic cerebro-spinal meningitis . . . the etiology is unknown . . . attendant circumstances indicate that some of the causes frequently assigned for enzootic cerebro-spinal meningitis, especially the defective draining of stables and paddocks, could not operate in these cases, nor could mouldy food have been the cause, since fungi cannot here grow in any great amount upon vegetation, owing to the extreme dryness of the climate. The annual numerical loss in the infected region could not be readily determined, but it reaches probably over 100 horses. This is a large percentage in this small and thinly settled area. Since the majority of the horses kept in the valley are used for work purposes, and since in many farms all the horses have died, the disease constitutes a formidable barrier to successful agriculture."

(Writers note: The disease described by Dr. Williams is apparently the equine encephalomyelitis of the present day.)

MYSTERIOUS HORSE SICKNESS IN MARYLAND (141).—A dispatch in the "New York Sun" dated Baltimore, Maryland, September 22, says: Dr. A. W. Clement, State veterinarian, has returned from a visit to the

Eastern Shore, where there is an epidemic among horses which has already caused the death of over a thousand of them. . . . He said today: "I am almost certain the disease is caused by the horses eating some poisonous vegetable matter. This theory is supported by the fact that the disease is almost entirely confined to horses which have been allowed to roam around in pastures. The horses are suddenly affected by the disease. They refuse to eat, gradually grow weaker, and are finally stricken with paralysis, and die within 48 hours. Post-mortem examinations of these horses show an inflamed condition of the stomach, suggestive of death by poisoning. The disease has appeared in the highlands of Harford county, where the water is of the purest quality."

LOSSES DUE TO BLACKLEG PREVENTED (142).—Early in 1897 the Pathological Division (of the Bureau of Animal Industry) began the manufacture and free distribution of a vaccine for immunizing susceptible cattle against blackleg. This undertaking grew rapidly until in 1917, more than six million doses were supplied yearly to cattle raisers. The use of this vaccine brought marked relief to cattlemen who had become greatly discouraged owing to heavy losses they had sustained. The preparation and distribution of the vaccine was discontinued June 30, 1922, by Act of Congress. - U. G. Houck.

1898: A REMARKABLE DISCOVERY - MILK FEVER CURE (143).—Milk fever of cows, or dropping after calving, as it was known to the older veterinarians and farriers, has long been the dread of the dairy-man. A disease of rather high mortality, difficult to treat, that occurred not long after calving and inevitably affected the highest producing cows. Up until 1898 little progress had been made in the treatment of this perplexing malady.

In the October issue of the American Veterinary Review, for 1898, appeared the first part of a lengthy article by J. Schmidt (a veterinarian of Kolding, Denmark) on parturient paresis (or milk fever), that was translated into English by Dr. W. L. Williams. In reference to his new treatment, Schmidt wrote:

"The infusion of an iodine salt in the udder, especially when accompanied with the introduction of atmospheric air, gives the promise of a quite typical result and has in a large measure brought about remarkably prompt recovery.

"In most patients the comatose condition disappears in the course of 4 to 6 hours, and in the very sick cows where the temperature was subnormal, this began to rise immediately after the infusion About half of the patients cured stood up and were free from paralytic symptoms after a course of six to ten hours."

It is recorded (144) that "so far as available information goes, it appears that Major Schwartzkopf was the first veterinarian in America to employ the Schmidt treatment for parturient paresis in the cow. On September 15, 1896, he read a paper on this subject."

AIR SAC MITE OF FOWL REPORTED IN AMERICA (145).—Although the air sac mite (*Cytodites nudus*, Ger.; *Cytoleichus sarcoptoides*, Meg.) has been studied by numerous European investigators at various dates since Gerlach's first description in 1858, we have found no record of the occurrence of the parasite or a disease referable to it in any English speaking country.

... The malady first attracted my attention by invading some pure bred fowls imported from the Atlantic States to Montana by the Experiment Station for breeding purposes. These were apparently healthy at the time of their arrival, and remained so for three or four weeks. Their permanent quarters not being ready they were placed temporarily in yards where occasional losses of poultry had previously occurred. . . . By the time the permanent quarters were ready a serious and fatal diarrhea had broken out among the turkeys, followed in a few days by a similar outbreak among the chickens, and continuing to spread slowly during the summer, caused a loss of over 30% of the adult birds and 50% of the chicks.

The chief symptoms were profuse diarrhea, extreme debility, and either cyanosis or paleness of the comb. The postmortem appearances consisted chiefly of diffuse enteritis, the posterior bowel being chiefly inflamed, and co-existent with this there appeared on the transparent membranous walls of the air sacs about the intestines, numerous minute opaque appearing objects, which, upon examination, proved to be air sac mites.

Inquiry being instituted, it was learned that poultry raising in Montana was generally unprofitable, owing to frequent heavy losses, largely from a malady simulating in symptoms that which was engaging my attention, so that with numerous natural advantages as to food and climate, the major portion of poultry and eggs consumed in the State was imported from long distances at high rates, and deteriorated in quality because of the long shipment. . . ." - W. L. Williams.

OSTEOPOROSIS IN PENNSYLVANIA (146).—By means of information received from “65 veterinarians representing nearly all portions of the State,” Dr. C. J. Marshall revealed “that the disease is comparatively rare in all sections of the State except Philadelphia and the immediate vicinity. Quite a number of cases were reported from near Pittsburg. With these two localities excepted there were only 127 cases reported. This covers all the cases observed by these men since they have been in practice. Only six were reported to have died. . . .”

1899: CASEOUS LYMPHADENITIS OF SHEEP (147).—In 1899 an investigation was made of a disease of sheep which, on post-mortem examination, were found to be affected with enlarged caseous lymph glands. It was first reported from southern California in 1897, soon after meat inspection was established there. As a result of this study it was determined that the disease was caused by an organism called *Bacillus pseudo-tuberculosis* of Preisz. The disease prevails in certain districts of the United States, but owing to its benign nature and very chronic course, its presence is seldom noted except on post-mortem examination - U. G. Houck.

Summary for the Period from 1885 to 1900

During this period the fact is well illustrated that the ravages of diseases among livestock were sharply curbed as a result of the efforts of organized veterinary science, principally in the form of the National Bureau of Animal Industry and similar state bodies.

New (heretofore unreported) diseases were reported and old ones better understood. The following seems to be particularly outstanding or otherwise interesting:

1. Pleuro-pneumonia of cattle, which by 1886 had seriously threatened the livestock of our nation, was declared to be completely eradicated in 1892, after five years of persistent efforts by agents of the Bureau of Animal Industry in co-operation with state and local officials and the private practicing veterinarian.

Secretary of Agriculture J. M. Rusk, concerning this matter, wrote (124): “. . . It tells a story of what untiring patience and firm determination will accomplish, and it proves to the people of the United States that in spite of all obstacles, oftentimes of unjust criticism, and of virulent opposition in some sections, our officers have succeeded in doing what at the outset was declared by many as an impossible achievement. . . .”

2. Regulations for the prevention of Texas fever (by quarantining cattle in the ticky area, etc.), to quote Secretary of Agriculture J. M. Rust (127) “. . . saved three times as much money to the cattle growers of this country yearly as is required to run the whole Department of Agriculture.”

The etiology of Texas fever was established (1892) by Theobald Smith, a scientist of the Bureau of Animal Industry, as a protozoal micro-organism (*Pyrosoma bigeminum*), and equally as important, Smith demonstrated that the disease was transmitted by the common cattle tick (*Boophilus annulatus*).

Dipping experiments conducted around 1897 marked the beginning of cattle tick eradication. By 1898 substantial progress was made, and cattle dipped (with certain provisions) in a certain oil and sulphur dip being allowed to cross the quarantine line without restrictions.

3. The tuberculin test was first used in America on cattle during March, 1891, and, within a few years bovine tuberculosis was the subject of countrywide interest amongst concerned individuals. Legislation enacted in Massachusetts during 1895 marked the beginning of State-wide eradication efforts by means of the tuberculin test.

4. Dourine of horses, which was apparently reported in Nevada in 1886, was positively found to exist in Illinois in 1887. The disease was eradicated in Illinois under direction of the State veterinarian. It was reported as existing in Nebraska and South Dakota in 1892 and was apparently brought under control by the aid of agents of the Bureau of Animal Industry.

5. Hog cholera, or the so-called, hog cholera, was definitely shown to be two distinct plagues—hog cholera and swine plague (see 1887, 1891, and 1897). It might be recalled that J. R. Dodge, statistician of the Department

of Agriculture, as early as 1867 suggested that (58) ". . . If the symptoms were actually noted, it would probably be found that several kinds of hog cholera—as every prevalent disease of the hog appears to be called—are uniting in the mischief produced."

Although a serum for hog cholera had been prepared by the Bureau of Animal Industry at an earlier date, by 1897 a serum was produced for the treatment and prevention of hog cholera and swine plague that was demonstrated to be quite beneficial.

6. Milk fever of cows.—A cure for this disease was discovered by a Danish veterinarian. Heretofore the disease had been little understood and was usually fatal (see 1898).

In 1906 Dr. Leonard Person, concerning this cure, wrote (148): "One discovery by a Danish veterinarian, a cure for milk fever, has already, in the course of five years, been the means of saving to owners of cows throughout the world a sum sufficient to equal all of the money expended on the construction, equipment and maintenance of all the veterinary schools established since the first one, at Lyons, in 1762."

7. Blackleg vaccine prepared by the Bureau of Animal Industry (1897) greatly reduced the losses by that disease. This disease had theretofore taken a great annual toll.

8. Nodular disease of sheep (heretofore unreported) was reported for the first time as occurring in Southeastern United States. A new parasite, the *Esophagostoma columbianum*, was found to be the causative agent.

9. Caseous lymphadenitis of sheep was reported for the first time (in North America), during 1899, as occurring in the West (California).

10. Air sac mite of fowls reported in America (Montana, 1895 and 1898). This was apparently the first report of the parasite in any English speaking country.

11. Severe outbreaks of anthrax among livestock in Illinois (1893), and the lower Mississippi Valley (1897).

12. Report of the United States Veterinary Medical Association (committee on diseases) for 1895, revealed that glanders disease of horses was relatively country-wide, with bovine tuberculosis and hog cholera being reported on many occasions, not to mention numerous other diseases of livestock.

13. Cerebro-spinal meningitis of horses reported (Idaho, 1896; Illinois, Delaware, 1895; Maryland (?), 1897).

14. Mad itch of cattle (which was reported during earlier periods) a fatal but little understood disease reported on many occasions (In the West, 1888; Iowa and Nebraska, 1890).

15. Parasitic ictero-haematuria, a fatal disease of sheep, reported for the first time in this country (Montana, 1895).

16. Actinomycosis causes much anxiety at Chicago (1892).

PART V—PERIOD FROM 1900 TO 1914

During this period the ravages of animal diseases were further curbed through the efforts of the veterinary police forces of our Nation. The veterinary profession further developed, with over 10 new schools being organized between 1900 and 1910. According to the United States census report figures, the number of veterinarians increased from 8,163 in 1900 to 11,652 in 1910, and to 13,494 in 1920.

By the beginning of the century the Bureau of Animal Industry had grown into an efficient organization with many separately headed divisions. The work of some of its scientists will always have a place in the history of medicine be it human or veterinary. Likewise many of our state livestock bureaus experienced a similar growth.

Thus, the mechanism that was set up in the past period for the control and eradication of animal diseases was increased in efficiency and strength, and, as could be expected, much progress was made.

1900: ON THE FREQUENCY OF RABIES OR HYDROPHOBIA (149).—There are certain European countries which keep very accurate statistics of rabies in animals, and the official reports of which may be taken as fairly reliable. In Germany these report 1,202 cases in 1898; in France, 2,374 cases in 1899; in Belgium, 444 cases, and in Hungary in 1895 there were 1,397 cases.

In the United States, unfortunately, we do not have general statistics concerning this disease. The writer (D. E. Salmon, Chief of the Bureau of Animal Industry) has recently requested information from the State veterinarians and from veterinary schools. A number of very carefully prepared replies have been received which are summarized as follows:

Dr. Charles P. Lyman, School of Veterinary Medicine, Harvard University, Boston, 25 or 30 cases in eighteen years. He mentions the case of a policeman in the town of Lynn who was bitten and dies.

Dr. W. J. Coates, American Veterinary College, New York, seven cases a year for 25 years.

Dr. H. D. Gill, New York College of Veterinary Surgeons, New York, eight cases a year for three years.

Dr. Wilfred L. Lellman, New York College of Veterinary Surgeons, four cases in his own practice and two in Dr. Gill's in one session.

Dr. Robert J. Wilson, Assistant Bacteriologist, Department of Health, New York, has confirmed the diagnosis during the last three years of 40 cases in domestic animals and three in human subjects.

Dr. Leonard Pearson, University of Pennsylvania, estimates 300 to 400 cases in 14 years. As State veterinarian he has found a great deal of cases among farm animals. In many cases diagnosis has been sustained by laboratory tests. In man during last year, two cases in Lancaster, one in Kennet Square, one in Philadelphia, one in Allegheny. Three years ago a prominent veterinarian of Pennsylvania died of rabies.

Dr. J. M. Wright, McKillip Veterinary College, Chicago, from January 1, 1900, to April 5, had seen 11 cases in the dog and 3 in the horse. Handles about 20 cases of rabies a year.

Dr. A. H. Baker, Chicago Veterinary College, Chicago, has had in the last year about 10 cases in the horse and 50 in dogs.

Dr. James Lavo, New York State Veterinary College, Ithaca, New York, has had brains of rabid dogs repeatedly sent there for diagnosis, from which successful inoculations have been made. He brought a piece of the medulla of Neil, the keeper of the dog pound at Newark, New Jersey, who died as a result of being bitten by a rabid dog, and inoculated a dog and several rabbits, some on the brain, others subcutaneously. All developed rabies and from whom inoculation with saliva or brain substance caused rabies in the lower animals.

Dr. S. Stewart, Kansas City Veterinary College, says that about 11 or 12 cases have been brought to the veterinary hospital within three years, 5 within one year.

Dr. John J. Repp, Veterinary Department, Iowa State College, says Dr. J. R. Saunders, of Corydon, Iowa, has noted 18 deaths of cattle with rabidform symptoms, 7 out of one herd of 50. The medulla of one of the 7 was sent to Dr. Repp, who inoculated a rabbit, which died in 18 days, after suffering 4 days with gradually increasing paralysis.

Dr. H. J. Detmers, Columbus, Ohio, formerly of the Ohio State University, has seen 3 cases in dogs and one in a horse since 1893.

The Health Department of Buffalo, reports a recent outbreak not yet entirely over, which investigated, on complaint, 45 cases in dogs, and that in addition, 74 cases of dumb rabies and 41 of furious rabies were brought to the pound. Animals other than dogs to the number of 27 were affected, and four persons died of the disease.

Dr. A. W. Bitting, Veterinarian of the Indiana Agricultural Experiment Station, reports one outbreak some years ago. Two or three dogs and several sheep and hogs belonging to the State were affected.

Dr. C. A. Carey, Agricultural and Mechanical College, Alabama, states 24 cases have been observed there.

Dr. J. W. Scheibler, State veterinarian, Kentucky, has seen about 20 cases.

Dr. George H. Bailey, State Veterinarian, Maine, had one case of dumb rabies in his practice in 1893. States that Maine General Hospital had one case in a young man several years ago.

Dr. A. W. Clement, State veterinarian, Maryland, reports about 30 cases brought to his attention officially.

Dr. Samuel S. Buckley, Veterinarian of the Agricultural Experiment Station, Maryland, reports that at College Park, Maryland, several years ago a collie bit three dogs, a calf and a cat, all of which developed the disease.

Dr. Curtice Cooper, State Veterinarian, North Carolina, reports having noted one case in the human subject since he has been in that State.

Dr. W. H. Dalrymple, Louisiana State University, and Agricultural and Mechanical College, has seen one typical case in a horse and at least 6 in cattle. Was informed by Dr. J. W. Dupree, Surgeon General of the State, that the latter had 3 cases in the human subject in his practice. In all cases the dogs which did the biting were preserved and died after showing characteristic symptoms of rabies.

Dr. F. A. Bosler, State Veterinarian of Indiana, reports 3 outbreaks of rabies in six years, affecting horses, mules, cattle, and hogs. Two young men were bitten, badly lacerated, and died in great agony.

Dr. H. P. Clute, State veterinarian, Wisconsin, reports 14 cases in dogs, sheep, cattle and horses. Rabbits inoculated at the State Experiment Station from the brain of a dog, died of rabies in 18 and 19 days; others inoculated from the brain of a calf died of rabies in 21 and 22 days.

Dr. A. T. Neale, Director of Delaware Agricultural Experiment Station, mentions death from rabies of three or four cows in one herd. Dogs and rabbits were inoculated from the medulla of one of these cows and developed the disease. A dog at the station which was bitten by a strange dog became affected with rabies. Diagnosis proved by inoculating rabbits. One case, in a horse, not tested by inoculation.

Dr. M. E. Knowles, State Veterinarian, Montana, has seen about 60 cases of rabies in 15 years, of which 53 were brought to his attention officially.

Dr. J. W. Elliott, State Veterinarian, South Dakota, has had as many as 100 cases brought to his attention in the past two years, mostly in cattle, and the disease could be traced to the bites of affected dogs.

Dr. G. T. Seabury, State Veterinarian, Wyoming, has seen 3 cases in dogs. He knows of a case in man caused by the bite of a skunk.

Dr. Sol Bock, State Veterinary Surgeon, Colorado, has seen at least 50 cases in the last year.

Dr. A. T. Peters, University of Nebraska, Animal Pathologist, reports about six different outbreaks recorded there. In one outbreak a dog bit several other dogs, a cow, and a horse. The cow was quarantined and died 31 days afterward of rabies. The horse was but slightly wounded and developed rabies after about 200 days.

Dr. L. L. Lewis, Department of Veterinary Science, Oklahoma Agricultural and Mechanical College, states that 2 cases of rabies has come under his observation since he has been in that position.

In the District of Columbia the first investigations of the Bureau of Animal Industry were taken up in 1893; they were discontinued during 1894, and were taken up again in the fall of 1895, since which time cases of canine rabies have been demonstrated every year. There have been sent to the laboratory by the Health Department a number of dogs every year that were suspected of rabies. As all such cases which have occurred have not been sent to the laboratory, it cannot be said that they have discovered all of the cases of rabies which have occurred. The number of demonstrated cases of rabies in dogs in the District of Columbia is as follows: In 1893, 11 cases; in 1895, 2 cases; in 1896, 5 cases; in 1897, 3 cases; in 1898, 7 cases; in 1899, 19 cases; in 1900 to July 31st, 29 cases, making a total of 76 cases in dogs. All of these cases have been tested by inoculation, and have given positive results. In addition to these figures a certain number of other animals have died of rabies.

Seven deaths of persons from rabies are recorded by the Health Department of the District of Columbia since 1877. In 2 cases the diagnosis was proved by rabbit inoculations.

These figures do not indicate that rabies is not such a rare disease as is alleged. So far from its being true that not one in a million supposed to be rabies is really that disease, we have found more cases of rabies than were

supposed to occur. Not even the more sensational newspapers in our city had as many reports of rabies in dogs as were actually found by these tests. - D. E. Salmon, Chief, Bureau of Animal Industry.

1901: MYCOTIC STOMATITIS - FOOT & MOUTH DISEASE SCARE (150).—During the summer and fall of 1901 cattle owners in many sections of the Middle West became alarmed at the appearance in their herds of a disease affecting the mouths and feet of cattle, which bore considerable similarity to foot and mouth disease. The outbreak was carefully investigated by Dr. Mohler (of the Bureau of Animal Industry) and found to be mycotic stomatitis, caused by eating grass upon which certain red and black rusts had formed.

This disease appears in some sections of the country nearly every year as a result of climatic conditions. When autumnal rains fall in a section that has been badly drouth-stricken during the preceeding summer months, the troublesome rusts develope quickly, followed by disease and loss of some cattle. In 1903 Dr. U. G. Houck (of the Bureau of Animal Industry) was sent to California to investigate a suspected outbreak of foot and mouth disease, but it proved to be mycotic stomatitis. - U. G. Houck.

TAKOSIS - A NEW DISEASE OF GOATS (151).—Considerable interest developed in dairy sections in goat raising in 1901 and 1902, and many goats were shipped from southern localities, where they were numerous, to more northern sections. After such transportation a destructive disease appeared in many instances, and extensive investigation was at once begun (by the Pathological Division of the Bureau of Animal Industry) to determine the nature of the disease. The lungs and digestive organs of the goats were affected, causing a steady wasting of the diseased animal, hence the name takosis were applied to the disease. The losses were caused by a small coccus which spread rapidly into the various tissues of the goat. To this destructive organism the name "Micrococcus caprinus" was given. Measures for checking the spread of takosis among goats were devised. - U. G. Houck.

SEVERE OUTBREAK OF INFLUENZA IN HORSES (152).—An enzootic of catarrhal influenza broke out in New York City and its environments about the middle of June, and it is estimated that 75,000 animals were victims. Not since the great epizootic of 1872 were so many horses simultaneously affected. Few horses died.

It was later recorded that "New York City veterinarians were never so busy as during the summer of 1901. After the influenza and heat prostration, purpura hemorragica was very prevalent."

1902 AND 1903: FOOT & MOUTH DISEASE OUTBREAK (153).—An unexpected outbreak of foot and mouth disease was discovered in Massachusetts and Rhode Island in November 1902. The Department of Agriculture first received an intimation of the existence of this disease on November 14, 1902, in a letter from Dr. Austin Peters, chief of the cattle bureau of Massachusetts. This letter states that a disease resembling foot and mouth disease had been discovered in Rhode Island, and that an investigation would be immediately made and the results reported. On November 17, Dr. Peters telegraphed that he believed the malady to be foot and mouth disease. Immediately upon receipt of this telegram, Dr. John R. Mohler, chief of the pathological division (Bureau of Animal Industry), was sent to Massachusetts to investigate and report upon the disease. . . . Dr. Mohler reported in a letter received November 24 that the disease was probably the European foot and mouth disease, and gave sufficient details as to symptoms and nature to allow an intelligent opinion to be formed. A calf and two sheep which he inoculated contracted the disease within 2, 4, and 5 days respectively.

As there was no history of the introduction of affected animals into the United States, and a declaration of the existence of the disease would have such serious consequences in commercial restrictions, it was deemed advisable to have additional expert opinions. Dr. Leonard Pearson, dean of the veterinary department of the University of Pennsylvania, and Professor James Law, dean of the New York State Veterinary College, were at once asked to proceed to Massachusetts and give an opinion as to the nature of the disease. Their joint report pronounced the malady to be foot and mouth disease beyond doubt was received November 27, and the quarantine order . . . was promulgated the same day. - Dr. E. Salmon.

Distribution of the Disease—It appeared that the disease had existed in Massachusetts since August and had extended over the eastern part of the State and into Vermont, New Hampshire, and Rhode Island. Twelve counties of these states were involved. Providence county, Rhode Island; Windsor and Plymouth counties, Vermont;

Middlesex, Worcester, Essex, Norfolk, Plymouth and Bristol counties, Massachusetts; and, Hillsboro, Rockingham and Merrimac counties, New Hampshire (154).

The Stamping Out Process—The activities of the Bureau were much retarded by the friction of State authorities in Massachusetts. On February 2, 1903; by Act of Congress, the Secretary of Agriculture was given sufficient powers so as to be able to over-ride all State interference in the matter of foreign and interstate transportation of livestock, so as to place the Bureau of Animal Industry in absolute control where such outbreaks of foot and mouth disease occur (155).

The work of eradication progressed rapidly and inside of 60 days from the beginning the country was practically free of the plague. Connecticut was released from quarantine December 22, 1902; Rhode Island, May 9, 1903; Vermont, September 11; Massachusetts and New Hampshire, October 14. During the outbreak 3,637 cattle, 235 calves, 360 hogs, and 229 sheep and goats were destroyed, making a total of 4,461 animals slaughtered (154).

The total cost to the National Government of eradicating this outbreak was \$300,000. The source of the infection remained a mystery, but information obtained in connection with the source of the next outbreak (1908) seemed to indicate that contaminated smallpox virus imported into this country was the source of the 1902 outbreak (154).

1902: ACUTE EPIZOOTIC LEUCOENCEPHALITIS - HORSE PLAGUE (156).—During 1902 an epizootic among the horses of Maryland resulted in the death of a great many after a brief illness. The disease was studied, and investigated in the pathological laboratory of the Johns Hopkins University, by W. G. Mac Callum of the John Hopkins University, and S. S. Buckley of Maryland State Agricultural College. In a lengthy report on the disease they related that "the disease, which is popularly known in this region as 'cerebro-spinal meningitis', presents fairly characteristic symptoms, which when the case appears in epizootic form lead readily enough to diagnosis."

Mac Callum and Buckley made a detailed histo-pathological study of the brains and other parts of effected animals and according to their findings applied the name "acute epizootic leucoencephalitis" to the malady. (Writer's note: The disease described is evidently the equine encephalomyelitis of the present day.)

DOURINE AGAIN - IN THE WEST (157).—Special attention was given to dourine disease of horses under the years 1886, 1887, and 1892. U. G. Hoek relates: "From 1892 until 1902 the disease continued to reappear in northwestern Nebraska and South Dakota after it had apparently been stamped out on several different occasions by inspectors of the Bureau (of Animal Industry).

"In 1902 a more vigorous and systematic campaign was inaugurated for the suppression of the disease. On January 20, 1903, the Department (of Agriculture) issued regulations governing the transportation of horses affected with maladie du coit. This order placed under quarantine the counties of Dawes, Box Butte, Sheridan and Cherry in the State of Nebraska, and the counties of Custer and Fall River and the Pine Bud and Rose Bud Indian Reservations in the State of South Dakota. It prohibited the movement of animals from the sections defined until they had been inspected and certified for shipment by an inspector of the Bureau of Animal Industry. A small outbreak of dourine occurred in Iowa in 1904. Gratifying progress was made in stamping out the disease and by 1903 it was practically eradicated from the areas in which the work was being carried on."

1903 - ETIOLOGY OF HOG CHOLERA DEFINITELY ESTABLISHED (158).—D. E. Salmon, Chief of the Bureau of Animal Industry, in the report of the Bureau for 1905, concerning hog cholera wrote as follows:

"Further experiments in the biochemical laboratory have thoroughly substantiated the statement in Circular 41 (A Form of Hog Cholera Not Caused by the Hog Cholera Bacillus. E. A. De Schweinitz and M. Dorset. 1903.), to the effect that a filterable virus is chiefly, if not wholly, responsible for the outbreak of the highly infectious form of hog cholera met with in southwestern Iowa. This filterable virus is present in the blood of sick hogs and is capable of inducing an attack of the disease when injected subcutaneously. . . . The disease produced in hogs by the filterable virus possesses all the characteristics of the natural disease, viz, contagious, infectiousness of the blood upon subcutaneous injection, immunity in those hogs which recover, and also the characteristic lesions and symptoms. All efforts to discover an organized form in the filtered virus have failed, and attempts to cultivate the unknown virus on the various media were equally fruitless.

"Parallel with the experiments with the filterable virus a series of experiments were carried out with pure cultures of *Bacillus cholerae suis*, which has been heretofore regarded as the sole cause of hog cholera. The use of that organism, however, failed to produce a disease which was contagious or which showed the characteristic infectiousness of the blood during the course of the disease and immunity in those which recover. The details of these experiments are given in Bulletin 72 (The Etiology of Hog Cholera. M. Dorset, B. M. Bolton, and C. N. McBryde.)."

ENZOOTIC CEREBRITIS - HORSE PLAGUE IN TEXAS (159).—During the fall of 1903 and the early spring of 1904, there occurred a very fatal disease among horses and mules called "blind staggers." In the valley of Brazos and Colorado Rivers the losses have been very great. No accurate data can be obtained, but we estimate the deaths of 4,000 and 5,000 head. It is a nervous disorder characterized by structural changes in the brain, which cause incoordination, delirium, coma, and usually death.

The disease attacks horses and mules that are highly fed. No cases have been observed among the old, emaciated horses belonging to the negroes, nor among cattle, hogs or other animals.

... There is a popular notion that the disease results from feeding mouldy corn. Another is that it is caused by inhaling the dust which occurs in mouldy, worm eaten or weevil eaten corn. . . .

(Extract: Corn affected with black, green and pink moulds were cared for artificially until dense growths were obtained. The feeding of such corn to horses, as an experiment, failed to produce ill effects.) - M. Francis.

1904: PROGRESS IN DOURINE ERADICATION.—During the year 76 animals were slaughtered because of showing evidence of the disease—4 stallions and 72 mares. In addition 1,103 stallions which were running at large were castrated, and 502 stallions to be used for breeding purposes were tagged for identification. The total number of animals inspected was 11,604. . . .

In order to make a comparative study of this disease, as it occurs in the United States, and of mal du coit, or dourine, as it occurs in France, arrangements were made to make a study of dourine and its trypanosoma at the National Veterinary School at Alfort, France. This work was assigned to Dr. J. R. Mohler, chief of the Pathological Division (Bureau of Animal Industry). Every opportunity was afforded him for the study of material at this school, and . . . a dog was inoculated with the protozoa *Trypanosoma equiperdum*, from a horse affected with dourine, and brought to this country for the purpose of making a more detailed study of this parasite and the disease it engenders in horses (160).

DOURINE IN CANADA (161).—During the latter part of 1904 Drs. V. A. More and Wm. H. Kelly, of New York, journeyed to Lethbridge, Canada, to study maladie du coit on behalf of the Commissioner of Agriculture. It was reported that "some 200 affected animals are to be slaughtered by the Canadian Government."

SCAB OF SHEEP AND CATTLE (162).—The total number of inspections for sheep scabies during the fiscal year (1904) was 40,967,961; the total number of dippings was 9,578,478 of which 1,957,278 were re-dippings. . . .

The total number of inspections for cattle scabies during the fiscal year was 1,124,321; the total number of dippings was 157,757 of which 59,788 were re-dippings. . . .

1905: STOMACH WORMS OF SHEEP (163).—The common stomach worm of ruminants (*Haemonchus contortus*), a particularly serious pest of sheep, was first carefully studied with reference to its life history by Ransom in 1905 and 1906. Prior to these investigations very little was definitely known concerning the life history of this parasite. . . . U. G. Houck.

GID PARASITE OF SHEEP REPORTED (164).—The first well authenticated case of gid in the United States was reported in 1905 by Ransom on the basis of some specimens found by Professor Cooley of the Montana Agricultural College in the brains of sheep that died in Bozeman, Montana. Further studies were afterwards made by Hall, who, among other findings, established the fact of the occurrence of the adult stage of the parasite in coyotes as well as in dogs. As yet, except for a few sporadic cases elsewhere, the parasite appears to be confined to the State of Montana, where it is, however, evidently well established and whence it is likely to spread to other localities.

sooner or later. Among the sporadic cases, one in New York in 1907 is of interest, as when brought to the attention of the Bureau through the publication of a paper in 1910 by Taylor and Boynton of Cornell University it was largely responsible in 1910 of a Federal quarantine on imported sheep dogs, this outbreak being traced by Taylor and Boynton to imported sheep dogs. . . . - U. G. Houck.

1906: DOURINE AGAIN (165).—The insidious venereal disease of horses known as maladie due coit, or dourine, which as existed in portions of South Dakota, Nebraska, and Iowa, is believed to have been practically eradicated as a result of several years vigilant work by the Bureau (of Animal Industry.). . . .

INTERESTING INFORMATION ABOUT BIGHEAD OF HORSES (166).—Very little literature has been presented on this disease (bighead or osteoporosis), which indicates either that limited attention has been given to it, or that it has been confused with other afflictions. In Europe the Disease appears to be quite rare and is usually described as a form of osteomalacia, a disease which is not uncommon among cattle of that Continent. "Bran disease" of European horses, said to be due to an excessive bran diet, is considered to be quite a distinct affection. This latter condition cannot be differentiated from the "millet disease" of this country, which is in practically all respects similar to bighead. . . .

. . . Bighead probably occurs more frequently in this country than in Europe, and in certain sections appears in enzootic form, as it does in Australia, South Africa, India, Madagascar, Hawaii, and the Philippines. . . .

The disease has been found in this country in all States bordering the Delaware River and Chesapeake Bay, in the District of Columbia, in some of the New England States, and in many of the Southern States, especially along the coast and in the regions of low altitude. - John R. Mohler.

BOTTOM DISEASE OF HORSES (167).—So-called "bottom disease" of horses is an affection of horses pasturing in the bottom lands along the Missouri River in Iowa and Nebraska. It is under investigation by the Pathological Division of the Bureau of Animal Industry. At the present stage of the work there appears to be reason for associating the malady with an affection of cattle known in Nova Scotia as Pietou disease, with Winton disease of horses of New Zealand, and with Molteno cattle disease of South Africa. - A. D. Melvin, Chief of the Bureau of Animal Industry.

SWAMP FEVER OF HORSES - A DESTRUCTIVE DISEASE (168).—A destructive disease known as swamp fever, typhoid fever of horses, and infectious anemia, appeared among horses in several Western States that were kept in low-lying sections and was called to out attention in 1906, when the (Pathological) Division began an investigation. Many valuable facts were learned regarding the disease, especially in regard to its transmission from horse to horse. By making use of these facts horses could be saved from contracting the infection, although no satisfactory remedy has been discovered for curing the cases that are once established. - U. G. Houck. 1924.

SURRA IN THE UNITED STATES (169).—An importation of Zebu cattle from India arrived at the port of New York in 1906. Dr. Mohler (Chief of the Pathological Division, Bureau of Animal Industry) requested permission to inspect the cattle the day before the quarantine period was to expire. Two of the Zebu seemed abnormal and at once aroused his suspicions. Blood was drawn from them and injected into rabbits which were procured in the vicinity, with the results that surra parasites were found. . . . The cattle that had developed the disease were promptly destroyed. . . . - U. G. Houck.

1907: COCCIDIOSIS OF CHICKS - HEAVY LOSSES (172).—Another disease which causes heavy losses of chicks between three and eight weeks old. This disease was investigated by the Pathological Division (of the Bureau of Animal Industry) during the year 1907 and found to be caused by a protozoan organism named *Eimoria avium*. - U. G. Houck.

PLAQUE AMONG QUAIL - QUAIL DISEASE (170).—A highly contagious and rapidly fatal disease of quail, designated "quail disease", was first studied by the Bureau (of Animal Industry) during the year 1906. The colon bacillus was found associated with the lesions, as had been shown by Klein in England. This disease has proved very

destructive among the quail captured in Mexico and shipped to the United States for stocking game preserves. A further study of this disease in birds of Mexican origin in the spring of 1920 disclosed the fact that a coccidium is a causitive agent in the production of the disease. . . . U. G. Houck.

1907: PROGRESS IN TICK ERADICATION.—Encouraging progress has been made (by the Bureau of Animal Industry) in the eradication of cattle ticks from the Southern States. This work, which was begun in the summer of 1906 under an appropriation by Congress of \$82,500 "to enable the Secretary of Agriculture to undertake experimental work in cooperation with State authorities in eradicating the ticks transmitting southern cattle fever," is no longer an experiment. The results already accomplished demonstrate that the extermination of this costly parasite is not only possible but practicable. . . . From January 1 to October 31, 1907, there were released from quarantine, or prepared from release in the near future, areas aggregating over 40,000 square miles.

This means that the cattle of an area almost as large as the State of Tennessee are, for the first time in years, to have an unrestricted market. . . . (171)

RAILROAD DISEASE OF CATTLE (172).—A description of this disease was translated from a German contemporary by J. P. O'Leary in the American Veterinary Review for November 1907. O'Leary reported having seen the same disease among cattle arriving at the Buffalo Stock Yards, and he was believed to have been the first veterinarian in America to identify the "railroad disease" of Europe.

J. F. De Vine, of Goshen, New York, in commenting upon the report of O'Leary, in the "Review" for December, 1907, wrote: "All dealers in this locality who ship cattle at any distance suffer a loss from this malady, but never before have I seen it described or named (173)."

1907 AND 1908: BOVINE TUBERCULOSIS THE TOPIC OF THE HOUR.—Veterinarians and stockmen had given much more attention to the subject of bovine tuberculosis than any other disease since tuberculin was first used as a diagnostic agent in 1891. It was the original intention of Koch (who first made tuberculin) that tuberculin be used as a cure for the disease in human beings. When tuberculin failed to give satisfactory results as a curative agent many European and American scientists immediately directed their attention to the preparation of a serum or vaccine. While much progress was made in that direction, especially by Leonard Pearson and S. H. Gilliland (working together) of Pennsylvania, no practical treatment for bovine tuberculosis has ever been developed.

Interesting Comments—A. D. Melvin, Chief of the Bureau of Animal Industry, at the International Congress on Tuberculosis, held at Washington, D. C., during the fall of 1908, among other things said: (174) "While the saving of human life affords the highest motive for combating tuberculosis, the prevention of financial loss is sufficient for undertaking the eradication of the disease from farm animals."

John R. Mohler, Chief of the Pathological Division of the Bureau of Animal Industry, in Addressing the American Veterinary Medical Association, during the fall of 1908, remarked (175): "There is probably no disease of animal or man which is at present receiving more consideration from the practitioner, sanitarian, and economist than tuberculosis. Furthermore it is one of the most prevalent diseases, and is responsible for more deaths among people, and greater loss to stock owners than any other affection."

Eradication Necessary (176)—In my opinion the time is very near at hand when our profession will be face to face with the problem of eradicating this plague from the herds of the country. It therefore stands us all in the hand to give the subject out most careful thought and consideration. It means the expenditure of millions of dollars of public money and a great financial loss to individuals. I again repeat that in a movement of this magnitude it is necessary to have the support of the public and the livestock owners in general in order to meet the success; and the principal object of this paper is to place before you the importance of informing stock owners and others of the great danger from tuberculosis - both from an economic and health point of view. - (A. D. Melvin, Chief of the Bureau of Animal Industry, addressing the September, 1907 meeting of the American Veterinary Medical Association.)

1908: A SERUM TO CONTROL HOG CHOLERA (176).—From 1904 to 1908 investigations under the direct supervision of Dr. Marion Dorset, Chief of the Biochemic Division of the Bureau of Animal Industry, resulted in the

perfection (by 1908) of a method of immunizing hogs against hog cholera by means of a serum. The efficiency of the serum was proved beyond a doubt as a preventative. The process of preparing the serum was patented by the Department of Agriculture in such a manner as to insure to all the people of the United States the right to its free use.

GREAT DEATH OF WILD DUCKS (177).—Again as for several seasons past, wild ducks are dying by hundreds in the marshy regions bordering Lake Erie, between Huron, ten miles east of Sandusky, and the mouth of Maumee River, near Toledo. Examination revealed the presence in the head feathers of many of the ducks found of a small insect not unlike a flea.

THREE DISEASES OF ANIMALS WHICH HAVE ASSUMED IMPORTANCE (178).—Dr. John R. Mohler, Chief of the Pathological Division of the Bureau of Animal Industry, at the 12th annual meeting of the Inter-State Association of Live Stock Sanitary Boards, which met at Washington, D. C., during September 1908, revealed that infectious anemia and mycotic lymphangitis of horses, and chronic bacterial dysentery of cattle "have recently been found to have a greater distribution in the United States than has theretofore been known, and they have therefore assumed importance to . . . State sanitary officers."

Infectious Anemia—Infectious anemia, or swamp fever (and many other synonyms) of horses "has recently been the subject of much investigation, and the cause of the disease has been definitely determined as an ultramicroscopic body.

"The disease is most prevalent in low lying and badly drained sections of the country, although it has been found in altitudes of 7,500 feet on the marshy pastures during wet seasons. . . . It usually makes its appearance in June and increases in frequency until October, although the chronic cases have been seen in the winter, having been contracted during the warm season. . . . From experiments already conducted it appears that this disease, formerly supposed to be confined to Manitoba and Minnesota, is more or less prevalent in Kansas, Nebraska, Colorado, Wyoming, Montana, North Dakota and Texas. . . ."

Mycotic Lymphangitis—"Epizootic lymphangitis, pseudo-farcy or Japanese farcy," to quote Mohler, "is a chronic contagious disease, particularly of equines, caused by a specific organism, the *Saccharomyces farciminosis*, and characterized by a suppurative inflammation of the subcutaneous lymph vessels and the neighboring lymph glands. Owing to the fact that this affection does not spread as an epizootic, and that its causal factor is a yeast-like fungus, the name mycotic instead of epizootic lymphangitis is suggested. . . . The presence of the disease in the United States was first observed by Pearson in Pennsylvania in 1907, although it is probable that it has existed in many parts of the country for many years. More recently its presence was definitely established in Ohio, Iowa, California and North Dakota, and there is a probability of its existence in Indiana and several Western States. The disease is also present in the Philippine and Hawaiian Islands and Porto Rico. . . ."

Chronic Bacterial Dysentery—This disease, as related by Mohler, "is a chronic infectious disease of bovines caused by an acid-fast bacillus simulating the tubercle bacillus, and characterized by marked diarrhea, anemia and emaciation, terminating in death.

"Recently the disease has been observed in the United States for the first time by Pearson in Pennsylvania cattle and later by Beebe in Minnesota and Mohler in Virginia cattle, and in an imported heifer from the Island of Jersey, at the Athenia Quarantine Station of the Bureau of Animal Industry."

THE INTRA-DERMAL TUBERCULIN TEST (179).—According to A. Liautard the test was first applied by Dr. Mantoux, a human physician, in his practice on tuberculous patients and that after him as a control, Professor Moussu of Alfort (Veterinary School) experimented with the test. Moussu revealed the nature of the intra-dermal test at the 1908 International Congress on Tuberculosis, and at that time recommended that the injection be made in the sub-caudal fold as at the present day.

AVIAN TUBERCULOSIS - INCREASING IN PREVALENCE (180).—The increasing prevalence of avian tuberculosis was recognized by the Pathological Division (Bureau of Animal Industry) and during 1908 a systematic study of the disease in fowls was inaugurated for the purpose of determining its relationship with mammalian tuberculosis, and especially with regard to transmissibility to hogs. Among the interesting results of the investigation was a demonstration of the ready susceptibility of hogs to avian tuberculosis through eating carcasses of fowls dead of the disease, and the finding of virulent tubercle bacilli in eggs from infected hens. - U. G. Houck.

1908 AND 1909: FOOT AND MOUTH DISEASE OUTBREAK (181).—On November 10, 1908, Dr. Leonard Pearson telegraphed the Bureau of Animal Industry at Washington, D.C., that foot and mouth disease existed in the vicinity of Danville and Watsonville, Pennsylvania. On November 12, Secretary of Agriculture James Wilson issued an order quarantining the counties of Columbia, Montour, Northumberland and Union in the State of Pennsylvania. On November 19 the entire States of Pennsylvania and New York were quarantined. On November 24 the State of Michigan was quarantined and by November 27 the State of Maryland was likewise.

Houck relates (182): "In this outbreak the disease appeared on 101 premises in 15 counties in Pennsylvania; on 45 premises in 5 counties in New York; on 9 premises in 2 counties of Michigan, and on 2 premises in 1 county in Maryland. During the outbreak 2,025 cattle, 1,329 hogs, 275 sheep and 7 goats were destroyed, at an appraised value of \$90,033. The total cost to the National Government of eradicating this outbreak was a little less than \$300,000.

"The quarantine regulations were modified from time to time to meet the conditions, and all restrictions were removed from Maryland and Michigan March 15, New York March 26 and Pennsylvania April 24, 1909.

Origin of the Outbreak (183)—The disease was traced from the points of outbreak in Pennsylvania on November 10, 1908, through New York, Maryland and Michigan, finally to calves that had been used for vaccine by a Detroit establishment. The fact that the cases of longest standing were found among these calves, caused Secretary of Agriculture James Wilson and A. D. Melvin, Chief of the Bureau of Animal Industry, to suspect that the vaccine was contaminated with the virus of foot and mouth disease. As the United States Public Health and Marine Hospital Service was charged by law with the supervision of biological products used in human medicine, that service was requested to join the Bureau of Animal Industry in making an investigation.

The main facts brought out in the report show that certain small-pox virus was imported by an eastern firm, which was contaminated with the infection of foot and mouth disease, and that on May 1, 1908, the western firm procured some vaccine of this strain. Calves used by the latter firm in propagating vaccine, were sent October 16 to Detroit stock yards and thence on the same day to a farm near Detroit. On October 20 three carloads of cattle from points in Michigan reached this Detroit stock yards and were put into pens that had been occupied by the vaccine calves four days previously. Some of these cattle were sold for slaughter at Detroit, while the remainder were shipped to Buffalo, and some were reshipped to Danville and Watsontown, Pennsylvania, where the disease was first observed some days later.

Three separate series of experiments were made by Drs. Mohler and Rosenau. Young cattle and sheep were inoculated with vaccine virus obtained from both firms. Foot and mouth disease was produced in experimental animals by the use of vaccine of the same strain obtained from both sources, while other strains of vaccine tested gave negative results. . . .

The investigations also revealed that the outbreak of foot and mouth disease in New England in 1902-03 was probably due to contaminated vaccine of Japanese origin from the eastern firm. . . .

1909: THE GREAT DEER LODGE VALLEY SMELTER SMOKE CASE.—Houck relate (184): "For some years prior to 1906 stock owners in the vicinity of the copper smelters has complained of great losses of animals under conditions which seemed to indicate slow, insidious poisoning. In the fall of 1906 the Pathological Division (Bureau of Animal Industry) participated in a study of the affected animals. It was found that the stack of a single copper smelter in Montana was ejecting from 22 to 30 tons of arsenic every 24 hours. The effect of the fumes and deposits on vegetation could be traced for twelve miles. Many horses, cattle and sheep in the affected areas showed the symptoms and lesions of chronic arsenic poisoning. Experiments revealed that similar symptoms could be produced by the continued feeding of arsenic."

A. Liautard, in an editorial in the American Veterinary Review for August, 1909, wrote: "Judgement has just been rendered in Montana in a case of the highest importance, involving not only a claim of some \$2,000,000 damages, but also the fate of the greatest copper smelter on earth. The suit was brought by the farmers of the Deer Lodge County, Montana, against the Anaconda Copper Mining and Smelter Company Dr. D. McEachran, Montreal, has charge of the Company's scientific defense. . . .

"Dr. McEachran associated himself (began in 1905) in his work with (veterinarians) Smith, Moore, Pearson, and others. Two hundred and fifty witnesses were heard and 835 exhibits placed as evidence. It is not surprising therefore that the judge who rendered the decision took nearly 2 years to go over the records and arguments in the case. (Decision was rendered in favor of the copper company.)"

D. E. Salmon recorded the following as a direct quotation from the opinion of Judge Wm. H. Hunt (185): “. . . that if the defendants are enjoined as prayed for, the smelter must close; that if it does close, their business and great prosperity will be practically ruined; that a major part of the sulphide copper ores of Butte cannot be treated elsewhere within this state; that thousands of defendants’ employees will have to be discharged; that the cities of Anaconda and Butte will be injured irreparably by the general effect upon internal commerce and business of all kinds; that professional men, banks, business men, working people, hotels, stores and railroads will be so vitally affected as to cause unprecedent depression in the most populous part of the state; that the county government of one county of the state may not be able to exist; that the farmers of the valley adjacent to Butte and Anaconda will not have nearly as good markets as they have enjoyed; that the industry of smelting copper sulphide ores will be practically driven from the state; and that values of many kinds of property will be either practically destroyed or seriously injured. . . . does not demand the injunction, as prayed for, should issue.”

Salmon remarked: “And thus ended what was, perhaps, the greatest contest in veterinary toxicology that has ever been heard and the farmers lost their case, but not because of failure to prove the fact of poisoning.”

TUBERCULIN TESTING OF CATTLE (186).—Cattle tested in several sections of the country (by the Bureau of Animal Industry) to determine the prevalence and extent of this disease among dairy cattle in the United States, revealed, that out of 8,809 cattle tested during the year, 744 or 8.45% reacted. A much higher proportion of disease was found among cows supplying milk to cities—about 14%.

1910: PURITIS OR MAD ITCH AGAIN (187).—This disease has been recorded on numerous occasions in earlier reports. A. F. Nelson reported on this disease at the 1910 meeting of the Indiana Veterinary Medical Association, from which the following is quoted:

Etiology—Consuming corn husks, corn stalks, corn cobs that have been fed to hogs and partially masticated and dropped out of the mouth or swollen and afterwards voluntarily ejected from the stomach. . . .

Symptoms—When first noticed the animal is seen rubbing its head against any object in reach; not marked at first, but as the disease progresses the rubbing becomes more violent, animal more restless; may rush from place to place, or plunge head onto the ground, seemingly using all the force at its command; bellowing at this stage, and from now on the animal gets rapidly worse and falls from exhaustion and may die in a few minutes. . . .

HOG CHOLERA PREVALENT IN MIDDLE WEST (188).—Hog cholera is so prevalent in the hog raising districts of the Middle West that the serum departments of the biological houses and the state experiment stations have not been able to supply enough serum to cope with the demand.

1911: REPORT OF THE A. V. M. A. COMMITTEE ON DISEASES.—During 1911 the committee on diseases of the American Veterinary Medical Association (the members of the committee being B. F. Kaupp, chairman; C. H. Higgins; J. R. Mohler; A. T. Kinsley; and, W. H. Dalrymple) produced an interesting and valuable report, from which the following material has been extracted (189):

According to the constitution and by laws of this association it is the duty of the Committee on Diseases to report on the character and extent of prevalent contagious diseases throughout America and report on the same at each meeting of the association. . . .

Actinomycosis—This disease prevails especially in the Middle West. The economic importance of the disease has caused most owners to have their animals operated on and treated in the early stages, so that the large numbers in advanced stages that accumulate in the government rejected pens at the stock yards at the large packing centers are gradually becoming less. It has been found at one large packing house in one of our large cities that approximately 1% of the beef tongues will be found to contain small actinomycotic areas if each tongue be carefully palpated.

Anthrax—Anthrax has continued to make its appearance in some of the Western and Southern States, especially Nevada, Texas, also in Delaware, and some of the Gulf States, also Northeast, especially Vermont as well as Canada. . . .

Avian Diphtheria—Is prevalent throughout the country and causes hundreds of thousands of dollars loss annually to the poultry industry. . . .

Amphistomiasis—Has been found in some cattle raised near Omaha, Nebraska. The *Amphistoma conicum* were found in the rumen. Very few reports of this parasite have ever been made from the United States.

Bursatti—Has again made its appearance throughout the greater part of the country.

Canine Distemper—Continues to be prevalent among young dogs in the entire country. . . (report of the work of Dr. N. S. Ferry) in which he probably proved beyond doubt the causitive germ of this malady . . . he proposes to call *Bacillus bronchiania*. . . .

Cerebro-Spinal Meningitis—Among horses has been reported in various parts of the country, especially in some of the Atlantic States. In some of these reports under the above heading the cause was attributed to mouldy corn, in others to mouldy silage. . . .

Chicken Cholera is widely distributed and causes much financial loss.

Coccidiosis is found in cattle, rabbits and in birds. The greatest loss is, perhaps, in young chicks. The *Coccidium tenelum* causes one form of white diarrhea and has been reported from the Eastern as well as the Western States.

Colic, gastric and intestinal, while not contagious, yet on account of its importance the committee wishes to call attention to it. This disease alone causes more loss annually the country over than any of the contagious diseases. Among the principal causes are those of over-feeding on corn chop, barley, etc. Alfalfa impaction, which most often occurs in the floating colon, gives considerable trouble in sections of the country where alfalfa constitutes the roughage.

Conjunctivitis Contagiosus of Cattle and Sheep—An occasional herd of sheep is reported with this malady. Two bands of sheep similarly affected are reported from the Rocky Mountain region during the past year.

Contagious Abortion in cows is assuming dangerous proportions. It is found distributed throughout the United States. Dr. Van Es reports similar conditions in mares in North Dakota. . . .

Dermatomycosis has been reported among sheep in Wyoming. The *Trichophyton tonsurans* has been demonstrated. . . .

Demodexic Scabies appears quite widely distributed among both hogs and dogs. It appears sporadically.

Dourine has again made its appearance in the United States. It was first observed in a stallion in southwestern Iowa. . . . Dourine still exists in Canada. The disease is well in hand and is confined to a small section of Alberta.

Enteroto-Hepatitis has been reported in turkeys from practically every state of the Union. In some sections its loss is serious, causing much financial loss.

Epithelioma Contagiosum in birds has been reported from the Atlantic, Middle West and Pacific States. . . .

Glanders still appears in the greater part of the United States and a portion of Canada. The identification by clinical signs and other measures and the destruction of diseased animals and disinfection of the premises is slowly but surely eradicating the disease from the continent. . . .

Gid in sheep is still a serious menace to the sheep industry of Montana.

Grub in the Hides of cattle are very common in the southern part of the United States, but grows gradually less until we reach the Canadian border. In some of the extreme Northern States no grub are found. Thousands of dollars loss occur every year in hides of cattle slaughtered during the grubby season.

Grub in the Heads of sheep and quite common in the sheep raising portion of the United States (Rocky Mountain region).

Hemorrhagic Septicemia has been reported from Georgia. This disease was also reported from one of the Northern States as occurring in sheep.

Hog Cholera is found wherever hogs are raised in the United States. It has been very common in the Middle West during the past winter and spring. While many of the State experiment stations are producing hog cholera serum, and many private firms as well as some of the biologic houses, yet there has not been sufficient serum available to supply all who have asked for it. This disease only sporadically in Canada.

Infectious Anemia is found throughout the United States and is serious in many localities. It is of considerable importance from an economic standpoint in Canada. Much investigation work has been done along this line, Dr. Van Es, of North Dakota, has proven the infectiousness of the urine in these cases. Drs. Francis and Marsteller, of College Station, Texas, have also devoted much time to experimental work along this line. The United States Bureau of Animal Industry has issued a bulletin on this subject. . . .

Johne's Disease of Cattle exists in Oregon, Wisconsin and Tennessee.

Lip and Leg Ulceration was first reported to assume a virulent form in sheep in Montana. In August, 1909, it has assumed such a virulent form in Wyoming that a Federal quarantine was placed on several counties in the

north-central part. . . . Most of the territory has been released, made possible through dipping with hot creolin solution and prevention of spread through movement of the infected flocks. . . .

Malignant Edema has been reported in isolated cases in both horses and cattle.

Necrobacillosis other than the form reported under lip and leg ulceration occurs in hogs and calves, especially in the Rocky Mountain district. . . . For the first time it has made its appearance among hogs and calves in the eastern part of the continent, especially Vermont. . . .

Nodular Disease of sheep occurs in native, but not in the range sheep. This disease still continues to be a serious problem in the sheep business of the South.

Ovine Caseous Lymph-Adenitis is still found among range sheep. The loss from this disease is about the same as in other years.

Poisonous Plants continue to cause hundreds of thousands of dollars of loss annually. (Much valuable work being done on this topic). . . .

Paralysis of the hindquarters in horses, sheep, pigs and rabbits have been reported from many quarters.

Pneumonia Verminous, still exists in some bands of sheep in the Southwest and some of the North Central States, as well as cattle along the Gulf.

Poll Evil and Fistula of the poll and withers continues to be common all over the country. The use of bacterial vaccines made from common pus germs, together with intelligent surgery and aftertreatment, makes this disease easy to handle, and the "vet" no longer takes down the back alley when he sees a case coming.

Rabies continues to spread and is now found in nearly every part of the United States. In some localities it is suppressed by effective muzzling ordinances, with destruction of all dogs found on the highways not muzzled. The disease has not been so prevalent in most of the States of the Western third of the United States as the year previous, while in the Central States the condition has been more serious. . . .

Scabies still exists in horses and sheep in most districts in the West and Northwest of the United States, but satisfactory progress is being made in its eradication. Scabies in horses and cattle is reported by Dr. Higgins as being well in hand in Canada.

Strangles in horses has been prevalent in most parts of the country during the past spring and early summer. Many are successfully using the bacterial vaccine made from the streptococcus equi, both as a preventive vaccine and a curative.

Symptomatic Anthrax exist more commonly in the western part of the continent, although this disease is reported to exist in Vermont and the northeast, as well as Canada. Vaccination has successfully combated this disease.

Sugar Beet Poisoning occurs in those parts in which sugar beets are raised, which are principally California, Utah, Idaho, and Colorado. Horse, cattle, sheep, and hogs are pastured on the fields after the beets are removed. The tops have some of the beet attached (left in the process of topping). The ingestion of large quantities of the tops and beet results in a gastro-enteritis, and in horses, colic. . . .

Strongylosis—Many forms of strongylosis are found in our domestic animals. More than 90% of the horses of the Middle West harbour *Strongylus armatus*. . . .

Texas Fever—A close study of the biology of the fever tick has been made during the past few years. . . .

Satisfactory progress has been made in the eradication of the tick and much territory is being placed above the quarantine each year.

Many experiment stations have continued to immunize northern calves by inoculating them with blood from "ticky" cattle preparatory to the shipment of the calves below the quarantine line.

Experiments have also been conducted with the view of finding a remedy which would curtail the enormous loss from this disease. . . .

Tuberculosis is exacting its usual toll both in human lives and lower animals.

The United States Bureau of Animal Industry in its last annual report gives tabulation of 400,008 cattle tested throughout the United States by state and government officials, giving as a result 37,000, or 9.35% found tuberculous. . . .

White Diarrhea in Chicks has been studied in the past few years by many experiment stations in the United States. It has been established that there are two forms of white diarrhea in young chicks. First, a coccidian form due to the coccidian *tenellum* and a bacillary form due to the *Bacillus pullorum*. . . .

TRICHINAE IN PORT - ILLNESS FROM (190).—As the Bureau (of Animal Industry) continued to receive occasional reports of illness from uncooked or insufficiently cooked pork it was found desirable during the year to give the press a statement warning the public against the danger of trichinosis. An average of about 1% of the hogs slaughtered in the United States are infested with the microscopic parasite commonly known as trichina or fleshworm. . . . No method of inspection has as yet been devised by which the presence or absence of trichina in pork can be determined with certainty, and the government inspection does not include inspection for this parasite. . . . - A. D. Melvin.

INTERESTING INFORMATION ABOUT BEEF AND PORK MEASLES (191).—About 1911 Bureau (of Animal Industry) inspectors, notable at the Omaha meat inspection station . . . began finding a considerable number of cases of tapeworm cysts (*Cysticercus bovis*), the intermediate stage of the unarmed tapeworm of man, *taenia saginata*, in cattle slaughtered under Federal inspection. This evidently was the result of improved methods of inspection rather than a sudden increase in the frequency of the parasite, which formerly was not often found in cattle slaughtered in the United States. In cooperation with many of the meat inspection stations, investigations on different aspects of the question of beef measles were carried out by the Zoological Division. . . . Among other facts of practical importance determined by these investigations may be mentioned those relating to the effects of freezing upon the vitality of *Cysticercus bovis*, in accordance with which slightly infested carcasses may be passed for food after they have been solidly frozen and kept under refrigeration not higher than 15 degrees F. for not less than six days. . . .

The Pork Measle parasite (*Cysticercus cellulosae*), the intermediate stage of the armed tapeworm of man, *taenia solium*, which is very rare in this country compared to the beef measles parasite, has been studied in the Zoological Division. . . . It is of interest to note that in the test inspection of about 1,000,000 hog hearts in 1913, these hearts coming from the hogs slaughtered during a period of two weeks at meat inspection stations in all parts of the United States, only 28 hearts were found infested with *Cysticercus cellulosae*. In a considerable number of the 28 cases the diagnosis was uncertain and in only a few of them was it definitely determined that the parasite was present. Since that time there has been no apparent increase in the prevalence of *Cysticercus cellulosae*. The comparatively few cases that were found each year trace back in most instances to localities with a large Mexican population. - U. G. Houck.

DOURINE AGAIN - IN THE WEST (192).—In June 1911, dourine, which was believed to have been eradicated from the United States several years previously, was found to exist in Iowa, and prompt measures were immediately taken under the direction of the Quarantine Division (Bureau of Animal Industry) for the eradication of the disease in cooperation with State authorities. In July, 1912, the disease was reported among horses in Montana, and as a result of investigations made at that time it was found that the disease had become more or less prevalent in the eastern part of Montana and the western portions of North Dakota and South Dakota. In December 1913, the work was extended to include an area in northeastern Wyoming, and in October 1914, into Nebraska. As a result of investigations begun in March 1914, the disease was traced to the Navajo Indian Reservation in Arizona and New Mexico.

Very fortunately the Pathological Division of the Bureau has found it possible to adopt the compliment-fixation test as a diagnostic agent for dourine, and the plan followed in the handling of this work consisted in the round-up of horses in suspected areas and the procuring of samples of blood serum, which were forwarded to the Pathological Division for examination. This was followed by the slaughter of reacting animals and later a retest of the herd. - U. G. Houck.

1912: THE KANSAS-NEBRASKA HORSE PLAGUE (193).—On July 20, 1912, an apparent infectious disease was observed among horses some ten miles north of Dodge City, Kansas. This disease spread for a radius of several miles, extending over the majority of Kansas and Nebraska, where the greatest loss occurred, and later invading particularly northern Oklahoma and eastern Colorado. . . . So far as the writer knows no definite data as to the actual loss was kept but it has been variously estimated that from 20,000 to 30,000 horses were lost from this outbreak. There were very few mules that contracted the disease. B. F. Kaupp, of Holly, Colorado, described the disease as being cerebro-spinal-meningitis.

State Veterinarian A. Bostrom, of Nebraska, reported during September 1912, as follows (194): "The epizootic disease among horses in Nebraska extends over two-thirds of the State. Horses take the disease in the sand hills and dry sections as well as in the low and damp sections. . . . The disease is very fatal, not more than 5% recover. . . ."

In the American Veterinary Review for November, 1912, A. D. Melvin, Chief of the Bureau of Animal Industry, commented (195): ". . . within the past two weeks the disease has suddenly disappeared. During this period there was a sudden change in temperature over the territory involved, with several frosty nights, lower humidity and cooler weather, and the disappearance of the disease in the range horses has been attributed to these changes in climatic conditions."

THE HOG CHOLERA PROBLEM (196).—The problem of the prevention and control of hog cholera is so important and so perplexing, and therefore of such vital interest to the rural veterinarians, that the Review has given freely to a great amount of space to its discussions and elucidation during the last few years, and invites short to-the-point articles discussing this many sided question. For until it can be definitely determined as to whether the serum only or the serum-virus method offers the greater immunity against the disease and the greater protection for the hog owner the full value of either method will not have been realized. - Editorial, American Veterinary Review, December 1912, page 271.

SHEEP SCAB PRACTICALLY ERADICATED (196).—In 1899 owing to complaints from England that American sheep shipped to that country were frequently found to be infected with scabies, the department (of agriculture) issued the first orders relative to the interstate shipments of sheep affected with that disease. Federal inspectors were placed at the principal feeding points of all railroads leading to market centers with instructions to inspect all shipments of sheep, and if any were found affected with scabies to supervise their dipping and treatment or allow them to proceed to a point where they could be dipped under Federal supervision. Later on this inspection of sheep was extended to points at which sheep originated and were accepted for interstate movement. . . . (This procedure) still did not eradicate the disease on the range to the extent that was hoped for. Accordingly, in 1904, a Federal quarantine was placed on all the territory west of the eastern border of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas, which included an area of 1,853,811 square miles. . . . (Cooperation with State officials was obtained).

As a result of work under this plan a large area was in 1907 released from Federal quarantine on account of the nonexistence of the disease, and from that time until the present (1912) there has been released an area comprising 1,171,590 square miles. This leaves only 682,221 square miles still in quarantine, and in this sheep scabies exists to a very slight extent. As illustrative to this point it may be stated that when the eradication work was first taken up in New Mexico, in the spring of 1907, 48% of the 4,500,000 sheep in that State were diseased . . . in the spring of 1912 . . . less than 1%. . . .

Contrary to prediction made by many woolgrowers, sheep scabies has within the last ten years been practically eliminated from the United States (by 1912), and as a result the sheep industry is in a very much more prosperous condition than when a heavy loss in the production of wool and mutton was each year experienced as the result of sheep scabies. - James Wilson, Secretary of Agriculture.

CATTLE MANGE GREATLY REDUCED IN PREVALENCE (196).—In 1904 it became evident to the department (of agriculture) that cattle scabies or mange existed quite extensively in the United States, especially in the territory west of the Missouri River and east of the Rocky Mountains. Accordingly, regulations tending toward the control and eradication of the disease were promulgated, and the areas where cattle scabies was known to exist to the greatest extent was placed under Federal quarantine. This included an area covering about 452,632 square miles in several Western States.

As in the work of eradicating sheep scabies, Federal and State cooperation was resorted to with the result that since 1907 cattle scabies had been successfully controlled and 218,572 square miles of territory released from quarantine.

. . . the extent to which the disease exists in the territory still remaining has been so greatly reduced, it will only be a short time until cattle scabies in the United States will be a matter of history. - James Wilson, Secretary of Agriculture.

PROGRESS IN CATTLE TICK ERADICATION (197).—According to Houck, tick eradication was commenced in earnest in July 1906, under the direction of the Inspection Division of the Bureau of Animal Industry. Dr. Rice P. Steddom, Chief of that Division was relieved from all other duties from July 1 to the latter part of the following January in order that he might devote all his time and efforts to organizing and pressing this new project.

The infested territory was divided into five districts: 1 - California; 2 - Texas, Oklahoma, Missouri, Arkansas and Louisiana; 3 - Kentucky, Tennessee, Alabama and Mississippi; 4 - Georgia and South Carolina; and 5 - Virginia and North Carolina.

Although the field operations were not commenced until late in July, by November 1, 1907, 29,315 herds, numbering 548,844 cattle located in 82 counties, had been inspected. Of this number 328,064 were found infested and 220,780 were found free of ticks. On November 1, 1907, a cleaned area comprising 40,970 square miles were released from quarantine.

The hardships encountered during the early years of tick eradication were of the severest nature. The principal impediments to the work were in the form of violations of the quarantine regulations (resulting in reinfestation of cleaned areas), ridicule of the work by prejudiced individuals, and the need of adequate State laws or the disinclination of State authorities to enforce existing laws.

“By 1910 the efforts of the Bureau to eradicate cattle ticks had attracted the attention of the officials of various railroads in the Southern States and also the management of some industrial concerns, as well as most banking institutions interested in the development of the South. Great impetus was given to the work by some of these organizations through the publication and wide distribution of literature stressing tick eradication as an economic measure of national importance affecting not only the cattle owners of the South but the merchants, bankers and all other businesses proportionately. Tick eradication began to assume the proportions of a great business enterprise, and skepticism regarding its practicability rapidly disappeared. The duties of the Federal inspectors, which up to that time had been in the nature of personal service, for the first time became really supervisory in character.” - U. G. Houck (197).

Houck further recorded (197) that from 1906 until 1923, inclusive, 564,590 square miles were released from quarantine, at a cost of - to the Department of Agriculture and the States and counties concerned - over \$23,000,000.

Development of the Arsenical Dip (198).—At the Nashville meeting in 1906, Dr. Joseph Parker reported that since July of that year he had been working under instructions from the Chief of the Bureau (of Animal Industry) in cooperation with the Livestock Sanitary Commission of Texas in experimenting with an arsenical dip based on an Australian formula which had been used with promising results by Dr. N. S. Mayo, Chief Veterinarian of Cuba. Dr. Parker’s report indicated that this dip was worthy of further trial. Following the experimental work of 1906, the Zoological Division, in cooperation with the Biochemic Division, undertook an extensive study of this dip. In California in 1907, following unsatisfactory experience with oils and other disinfectants, the arsenical dip with the addition of soap, was used extensively, with such good results that this dip was given official approval by State authorities and was generally used from that time until the work in that State was finished. The arsenic-soda-pine-tar preparation, which later became known as “boiled dip”, came into favor rapidly, and, effective November 1, 1911, an order was promulgated permitting the use of arsenical solution as an official dip for the interstate movement of cattle originating in the quarantine area.

The development of the arsenical dip proved a boon to tick eradication, for the activities in the field were beginning to lag by 1911, owing to the fact that none of the methods used in the eradication work up to this time had proved entirely satisfactory. . . . (It was also demonstrated that an unoxidized arsenic was more efficacious in destroying the ticks than oxidized arsenic, and, a practicable field test was devised to test the strength of the dip, so that if necessary more arsenic could be added to bring the dip up to the required standard.)

BLACKLEG VACCINE - GREAT LOSSES PREVENTED (196).—The extensive losses of young cattle from blackleg, together with the perfection of a protective vaccine by Kitt and other European investigators, led to the inauguration in 1897 of the manufacture and distribution of blackleg vaccine by the department (of agriculture). In the past 15 years (1897 to 1912) more than 17,000,000 doses of this vaccine have been distributed to stock raisers. In regions where blackleg prevailed the losses formerly amounted to more than 10% of the annual calf crop, but by the use of the vaccine the losses have been reduced to less than 0.5% of vaccinated cattle. . . . - James Wilson, Secretary of Agriculture.

THE DETECTION OF GLANDERS AND OTHER DISEASES (196).—The diagnosis of glanders, Malta fever, dourine, and infectious abortion by the application of the complement-fixation tests to the blood serum is one of the recent achievements that has far reaching importance. By this means accurate and prompt results may be obtained. - James Wilson, Secretary of Agriculture.

TUBERCULIN AND MALLEIN (196).—For many years the Bureau (of Animal Industry) has furnished free of charge to official veterinarians, health officers, etc., tuberculin for the diagnosis of tuberculosis in cattle and mallein for the diagnosis of glanders in horses. During the 16 years (1897 to 1912) approximately 2,000,000 doses of tuberculin and 500,000 doses of mallein were supplied to State, county and municipal officials.

1914: THE GLANDERS QUESTION.—Glanders like the poor, is always with us, and from what we can learn always been with us. But is it to stay with us? Sometimes we think so, when we find we are gaining so little in our fight against it in the big cities. For some time the watering trough has been conceded a prolific source of contagion and many new kinds of troughs have been recommended to overcome the danger of contamination of the water; but glanders has continued on the increase despite these precautionary efforts; the probable reason being that these improved troughs have not overcome the danger; the contamination remains. That has brought us face to face with the realization that the only way to remove the contamination of glanders from horse to horse through the watering is a very radical measure; i.e., the removal of the watering trough. This has been done in Minneapolis with a striking diminution of the cases of glanders in that city. It has been found necessary to do it in Philadelphia, where glanders has been found on the increase; it has been done or about to be done in Jersey City, New Jersey, and a strong movement is on hand in New York to substitute the trough for the faucet. This movement was started by the Grand Jury of Bronx County. Some of the members of the said Grand Jury having lost a number of valuable horses from glanders had a committee of this Grand Jury make a personal investigation. - Editorial, American Veterinary Review, June, 1914.

THE DESTRUCTION OF TRICHINAE IN PORK (199).—Until it was discovered by Ransom (a scientist of the Bureau of Animal Industry) in 1913 and announced in 1914 that trichinae in pork could be destroyed by refrigeration it was considered that the parasite was unaffected by cold. It has been shown, however, that if the temperature is low enough the trichinae invariably die in a comparatively short time. Trichinous pork kept at a temperature of not exceeding 5 degrees F. for a period of 20 days become quite innocuous. - U. G. Houck.

Concerning this topic, Houck continues (199): "Studies in the Zoological Division (Bureau of Animal Industry) by Ransom and Schwartz, the detailed results of which were not published until 1919, established definitely the thermal death point of trichinae, concerning which many conflicting and loose statements were previously current, and the Bureau now recognizes a temperature of 137 degrees F. as ample for the destruction of trichinae.

"As comparatively little experimental work had ever been done on the effects of curing upon trichinae, some investigations upon this question were begun in 1914, the detailed report of which was issued in 1920 (Ransom, Schwartz, Raffensperger). Based on these investigations a number of practical methods of curing for application to various kinds of pork products customarily eaten without cooking have been formulated which can be depended upon to destroy the vitality of any trichinae which may be present.

"Finally it has been shown by experiments reported by Schwartz (1920, 1921) that the vitality of trichinae may be destroyed by x-rays in massive doses. No practical method of using x-rays for trichinae destruction, however, has been discovered.

1914 and 1915: FOOT AND MOUTH DISEASE OUTBREAK (200).—This outbreak made its first appearance on August 2, among hogs on a farm situated near Niles, Berrien county, Michigan, but was not positively diagnosed until October 15, 1914, when the Bureau of Animal Industry reported positive results from animal inoculation tests. The Secretary of Agriculture quarantined Berrien and Cass Counties, Michigan, and St. Joseph and Laporte Counties, Indiana, on October 19th.

Despite the vigorous measures that were at once begun by State and Federal authorities to confine this outbreak to the area where it first made its appearance and stamp it out there, it spread rapidly, and very soon 13

States had been quarantined: Massachusetts, New York, Pennsylvania, Indiana, Illinois, Michigan, Ohio, Wisconsin, Maryland, Iowa, Rhode Island, New Jersey, and Delaware, being more extensive than any of the five previous outbreaks (201).

For the first time in the history of the American Veterinary Medical Association it was Medical Association it was found necessary to cancel the scheduled meeting that was to be held in New Orleans in December, 1914, so as to leave the entire force of Federal, State, and privately practicing veterinarians free to participate in the eradication of the plague.

By January, 1915, reports concerning this outbreak—which by the end of November had spread to 20 states and the District of Columbia—indicated a steady gain by Federal and State sanitary forces in its eradication, and it was expected to be entirely eradicated before the end of the winter season of 1915. Reports up to December 23 gave 78 counties in Iowa entirely released from quarantine, also the entire eastern and western portions of Kentucky, and the northern peninsula of Michigan, many of the northern counties of Wisconsin and the lower third of Illinois, besides modifying the quarantine in many of the States previously referred to (202).

Concerning the source of the outbreak, A. D. Melvin wrote (203): "How it was introduced or whence it came remains as deep a mystery today as at the beginning of the outbreak, although many suggestive clues have been investigated and disproved."

Though the disease appeared to be completely eradicated by June 18, 1915 a small outbreak was reported in New York during July, and during August the disease was found to be spreading among hogs in Illinois, Indiana and Minnesota. In the latter case it was found to be due to a hog cholera serum (produced at a Chicago establishment), which contained the virus of foot and mouth disease. A small outbreak which proved to be the last, occurred in Christian County, Illinois, during the early part of 1916 (200).

The quarantines—which in all extended to 22 States and the District of Columbia—were modified from time to time and the last restrictions were removed June 5, 1916 (200).

Houck relates (200): "The cost to the National Government and the States of eradicating this, the most extensive outbreak that has appeared in this country, was approximately \$9,000,000, which is a small sum compared with the damage that would have resulted if the disease had been allowed to spread and become permanently implanted in this country."

PROTECTION AGAINST FUTURE OUTBREAKS (204).—As a protection against future outbreaks of this and other diseases of a character to seriously threaten the livestock industry, Congress has made a special appropriation of \$1,250,000.

Summary for the Period 1900 to 1914

The ravages of animal plagues during this period were greatly reduced by the veterinary police forces of our continent, with eradication being approached in some instances, and being completely achieved in the case of foot and mouth disease. Practically all animal plagues and other diseases were better understood.

In spite of this progress, the annual loss of our livestock due to disease was still enormous, and the support offered by our National and State governments in many instances was still insufficient to enable the veterinary police forces to attempt the efficient control or eradication of many serious animal plagues.

The important features of this period may be summarized as follows:

1. Three serious outbreaks of foot and mouth disease were completely eradicated from our continent (1902-03; 1908-09; 1914-15). The latter outbreak being the most serious ever to visit our shores, and was completely eradicated after having spread to 22 States and the District of Columbia.

Congress made a special appropriation of \$1,250,000 (1915) as a protection against future outbreaks of this and other diseases.

2. Horse plague (equine encephalomyelitis) reported from many States (Maryland, 1902; Texas, 1903; Atlantic States, 1911; Kansas and Nebraska, 1912).

3. Dourine disease of horses persists in the West but is kept under control (Nebraska, South Dakota, Iowa, and Canada—see 1902, 1904, 1906, 1911, 1912).

4. Rabies, especially among dogs, was demonstrated (during 1900) to be much more prevalent than it was previously thought to be.

5. Cattle tick eradication was carried on with much progress being made. This work was especially facilitated by the development of the arsenical dip (see 1907, 1912).

6. Bovine tuberculosis was given much attention by sanitarians, with eradication measures being called for.

7. Sheep scabies, which was becoming a serious pest in the sheep raising districts of the West, by 1912 was practically eradicated (see 1912).

8. Cattle mange, like sheep scabies was becoming a serious problem in certain Middle Western States, but, by 1912 eradication measures greatly reduced its prevalence (see 1912).

9. Losses of young cattle due to blackleg greatly reduced by the use of a vaccine distributed by the National Bureau of Animal Industry (see 1912).

10. Influenza affected 75,000 horses in and around New York City during 1901

11. Surra, a destructive disease non-existent in North America, was diagnosed in the United States in imported Zebu cattle in 1907. The cattle harboring the parasite of the disease were promptly destroyed.

12. Many diseases of livestock which had heretofore been unknown or not reported in America were recognized and studied by agents of the National Bureau of Animal Industry and similar State organizations, with efforts being directed towards their control and if possible their eradication. This includes such diseases as *takosis* of goats (1901), *swamp fever* of horses (1906, 1908), *mycotic lymphangitis* of horses (1908), *chronic bacterial dysentery of cattle* (1908, 1911), *gid disease* of sheep (1906, etc.

13. Hog Cholera due to a filterable virus. A serum developed to control the great porcine scourge.

PART VI—PERIOD FROM 1915 to 1939

Author's Note: In view of the fact that material concerning animal plagues and other diseases is somewhat plentiful, a work of this nature might be more appropriately entitled, "Notes on Animal Plagues of North America." In presenting information concerning the occurrence of animal plagues from year to year, the need of veterinary medicine has been illustrated. In presenting information concerning the control and eradication of these plagues, some of the major achievements of the American veterinary profession have been recorded in a passive manner.

It is the sincere hope of the writer that a work of this nature will serve to favorably convince beyond a doubt, those who lack an appreciation of the importance of veterinary medicine. From his study of animal plagues the writer has concluded: that there can be no finer or more convincing way of realizing the importance of veterinary medicine to the livestock industry of our Nation than by the acquirement of a general knowledge of the major achievements of the American veterinary profession.

The period 1915 to 1939 is a period characterized by great progress in disease control and eradication work. During the early part (a war time) and during the close of the period (a depression time) amuch greater sums than usual were appropriated by our National and State governments for the control and eradication of animal plagues. Thus, by the end of this period, the ravages of animal diseases that had become so destructive towards the close of the twentieth century were practically brought under the control of the veterinary police forces of our nation.

1915: MEAT CONSERVATION - ELIMINATION OF ANIMAL DISEASES (205).—Secretary of Agriculture, D. F. Houston, in the Report of the Department for 1915, wrote: "Last year the ease with which the meat supply can be increased materially by controlling or eliminating the common live stock diseases was pointed out. The direct losses from them are enormous. It is impossible to give any accurate statement even of direct losses. The indirect losses, which are also great, cannot be estimated at all. It has been conservatively estimated on the basis of data for 30 years that the annual direct losses from animal diseases are approximately \$212,000,000. The loss ascribed to each disease is as follows:

Hog Cholera	\$75,000,000
Texas fever and cattle ticks	40,000,000
Tuberculosis	25,000,000
Contagious abortion	20,000,000
Blackleg	6,000,000
Anthrax	1,500,000
Scabies of sheep and cattle	4,600,000
Glanders	5,000,000
Other live stock diseases	22,000,000
Parasites	5,000,000
Poultry diseases	8,750,000

HOG CHOLERA SERUM (206).—In round numbers there are produced annually in the United States 200,000,000 cc of serum. Of this amount, approximately 50,000,000 cc, or about 25% are prepared by State governments. Serum is produced by the Federal government for experimental purposes only. The remaining 150,000,000 cc are manufactured by private establishments. It is probable that there are in operation in the United States between 90 and 100 such establishments. Of these, 81 have secured licenses from the Department of Agriculture under the serum-toxin act of 1913, and thereby enabled them to carry on interstate business. Of the total quantity of serum privately prepared, it is estimated that more than 90% comes from plants holding licenses from the department. - D. F. Houston, Secretary of Agriculture.

1916: DESTRUCTIVE DISEASE OF BABY CHICKS (207).—Bacillary white diarrhea of baby chicks is one of the most destructive of poultry diseases. Since its primary source is the infected hen, and the causative microorganism, *Bacterium pullorum*, is transmitted through the egg, the principal problem in its control is the detection and elimination of the adult carriers. During 1916 an intradermal test for application in the field was developed and found to compare favorably with the laboratory serum test. - U. G. Houck.

MEAT CONSERVATION AND DISEASE ERADICATION AGAIN (208).—During the years of the World War, one of the principal aims of the Department of Agriculture was to increase the meat supply of the nation. The activities of the department were in two principal directions: (1) Checking and eliminating diseases and parasites and (2) increasing and improving stock raising by extending the industry where conditions were favorable and by pointing the way to better breeding and feeding.

The eradication and control of such diseases as Texas fever, hog cholera, contagious abortion, tuberculosis of cattle and sheep, and cattle scabies, was consequently accelerated.

CONTAGIOUS ABORTION A NEW ISSUE (209).—While contagious abortion had been receiving the attention of the Bureau of Animal Industry since 1900, and by occasional scientists before and after that time, the disease was given a great deal of attention by the prominent veterinarians of the land around 1916. It was indeed a new issue. An abundance of information concerning the disease was produced.

Secretary of Agriculture D. F. Houston, in the Yearbook of the Department for 1916, wrote: "Contagious abortion in recent years has reached such proportions as seriously to threaten the cattle raising industry. . . . The last Congress, upon the recommendation of the department, made a special appropriation of \$50,000 for attacking the problem," (209)

VESICULAR STOMATITIS - FOOT AND MOUTH DISEASE SCARE (210).—During the early fall of 1916 reports were received from several sources to the effect that a disease involving the mouths and particularly the tongues of horses existed in the concentration remount stations in the vicinity of Chicago, Illinois. A careful and systematic investigation was immediately inaugurated, which indicated that at this time the disease was confined solely to equines and that the infection could be traced back to similar remount stations at Grand Island, Nebraska, and Denver, Colorado. At these points the horses and mules had been gathered together by agents of the French and English governments for shipment abroad, and the disease found ideal conditions for its spread among the thousands of these animals closely quartered in barns and pens. As the disease was undoubtedly contagious, local quarantines were recommended and enforced. . . .

Several weeks later a livery stable in Chase county, Nebraska, became infected as a result of the owner shipping a carload of horses to Denver for Army purposes and the return to the livery stable of several rejected horses. Three or four days later these rejected animals developed the disease, which spread to other horses and one cow in the livery barn. The disease was carried back to several ranches in that vicinity by the ranch horses which had been driven to town by their owners and fed and watered at this public livery barn.

The disease now seems to have reached its most virulent stage, and having affected many of the horses on these ranches, it spread to a number of cattle. . . .not (to) hogs in the same pasture.

The spread of the disease to the Chase county district was brought indirectly to the attention of the Bureau (of Animal Industry) late in November, when a shipment of cattle from that locality to the Kansas City Stock Yards was found by the bureau inspectors to be affected with lesions in the mouth strikingly similar to those of foot and mouth disease. All precautionary measures were immediately taken, outgoing shipments from the yards were stopped, the cars carrying cattle were located and disinfected, and the cattle were traced to their point of origin in western Nebraska. In the meantime experts were sent to the latter point as well as to Kansas City, and series of careful and comprehensive experiments were immediately inaugurated at those points and also in Washington. As a result of these tests and the reports of the field inspectors, the opinion was reached that the disease was not foot and mouth disease, but vesicular stomatitis, a contagious disease of horses, but at times spreading to cattle also.

The most striking lesion of this disease is the occurrence of vesicles or blisters followed by erosions chiefly on the tongue, but also involving other portions of the mouth and occasionally the muzzle. This disease is known in Europe and South Africa and has been observed in the United States. The present outbreak, however, is the most extensive yet noted in this country. While the disease has not the great economic importance of foot and mouth

disease, it nevertheless is contagious and causes considerable alarm owing to its close resemblance to the dreaded European disease. . . .

TURKEYS AND THE GAPEWORM (211).—Turkeys are probably the natural hosts of gapeworm—a serious pest among young chickens—and are an important factor in their spread. This has been demonstrated as the result of experiments and other investigations carried on at Washington, D.C., and on farms in several localities in Maryland, as reported by Dr. B. H. Ransom, Chief of the Zoological Division of the Bureau of Animal Industry, in Bulletin 939 of the Department of Agriculture.

During three winter seasons beginning in December, 1916, a total of 679 turkeys were examined in the Washington City market. No gapeworms were found in the chickens, but 22.5% of the turkeys were found infested. . . .

It is interesting to note (8) that Wiesenthal, of Baltimore, in 1799, reported on the “‘gaps’, which destroys eight tenths of our fowls in many parts, and takes place in the greatest degree among young turkeys and chickens bred upon old established farms.”

TUBERCULOSIS ERADICATION INAUGURATED (212).—Secretary of Agriculture D. F. Houston, in the Yearbook of the Department of Agriculture for 1916, wrote: “Despite all that has been done in the past 10 to 15 years, there is no indication that tuberculosis of cattle and hogs is on the decline in the United States. It has been reduced or partially checked here and there, and even eradicated from some herds: but generally it is as prevalent as ever. The disease can be prevented and some definite system of eradication should be inaugurated. Three undertakings seem practicable at this time. . . . Eradication from pure bred herds. . . . Eradication from hogs. . . . Eradication from restricted areas. . . .

“The department has recommended in the estimates for the next fiscal year that an appropriation of \$75,000 be made for the inauguration of the work.”

Prior to 1917 considerable official and unofficial tuberculosis eradication work was taken up in the various parts of the country, but the cooperative campaign by the State and Federal Governments was not organized until 1917. . . .

The “accredited herd plan” put into effect in December, 1917, has proven to be one of the important steps in the cooperative campaign. Out of it has grown what is known as the “area plan”, which means the tuberculin testing of all cattle within a definite area or section of the country; usually a county is taken as a unit. The area project is becoming very popular, and the outlook for complete eradication of bovine tuberculosis is hopeful (213).

First Tuberculosis Eradication Conference (214).—The conference called by the Bureau of Animal Industry at Chicago, October 6 to 8, 1919, to discuss the problem of tuberculosis eradication was the first of its kind, and 158 delegates from various parts of the country were in attendance. . . .

TICK ERADICATION A WAR MEASURE (215).—The United States Congress, now in session, has recently passed a law entitled “An Act to provide further for the national security and defense by encouraging the production, conserving the supply, and controlling the distribution of food products and fuel.”

The law appropriates a sum of money for “Tick Eradication” in the interest of food production and conservation, thus making the getting rid of ticks a war measure.

Conference on Tick Eradication.—The greatest gathering ever held in conference for the advancement of the work of eradicating the cattle fever tick was held in New Orleans, January 15 to 18, 1918, the session lasting 4 days with an attendance of approximately 300 workers and veterinarians from all Southern States where the work is still in progress. (216)

FOOD CONSERVATION - ANIMAL DISEASES (217).—The Food Production Act—“An Act to provide further for the national security and defense by stimulating agricultural products”—is administered by the Department of Agriculture, and carries an appropriation of \$11,346,400 for the following purposes:

1. (The following was first among six listed purposes.) The prevention, control, and eradication of the diseases and pests of live stock; and the conservation and utilization of meat, poultry, dairy products, \$885,000.

1918: ANOTHER DISEASE OF SWINE - HOG FLU (218).—The occurrence of diseases which affect the respiratory organs of hogs has long been recognized . . . in the fall of 1918 there appeared, for the most part in the Middle West, a disease of swine clearly independent of hog cholera and of parasitic infestations, which presented as its chief symptoms labored, jerky respiration, a severe spasmodic cough, fever, and usually great prostration . . . on a whole herd, or on a very large proportion of a herd. . . .

Dr. J. S. Koen, then an inspector in the Division of Hog Cholera Control of the Bureau of Animal Industry, not only recognized this disease as being different from any that he had previously encountered, but was so impressed by the coincidental prevalence of human influenza and by the resemblance of the symptoms seen in man to these occurring at that time in hogs that he became convinced that the two were actually the same, and he therefore gave the name of "flu" to his new disease of hogs. Subsequently, observation has not served to substantiate Dr. Koen's original assumption that human influenza and "hog flu" are the same. In fact, although the etiology of both diseases remains undetermined, the continued and apparently unabated prevalence of "hog flu," taken together with the marked decrease in human influenza during the past two or three years leaves little ground for the belief that there is a relationship between the two diseases. The name of "flu" as applied by Koen seems nevertheless to be rather apt, it has been generally employed. . . . - M. Dorset, C. N. McBryde, and W. B. Niles, November 1922.

FORAGE POISONING - BOTULISM (219).—At the 1917 meeting of the American Veterinary Medical Association, R. Graham, A. L. Brueckner, and R. L. Pontius, reported on their "Studies in Forage Poisoning." The following has been abstracted from the original report:

" . . . Experimental data available at this time, however, indicate that the type of forage poisoning in horses and mules caused by the ingestion of oats and hay and an ensilage in remote outbreaks in Kentucky are closely related to if not identical with a sporadic and clinical forage poisoning observed by Professor H. P. Rusk and Dr. H. S. Grindlay of the University of Illinois occurring on the McLean farm at Ottawa, Illinois. . . .

" . . . The serological treatment of forage poisoning is thus suggested as the result of the apparent relation of serum immune to *B. botulinus* in protecting against a micro-organism resembling *B. botulinus* at the Kentucky Station (Agricultural Experiment Station at Lexington, Kentucky) from the three feeds obtained from natural outbreaks of the disease. . . . In 1916 Drs. Buckley and Shippen brought out the pathogenic nature of *B. botulinus* to horses, and noted a clinical and anatomic resemblance of *B. botulinus* intoxication artificially induced to sporadic forage poisoning. . . .

AUGMENTED DISEASE ERADICATION - FOOD CONSERVATION (220).—The increasing control and eradication of animal diseases stimulated production on a more economical basis. For years the Department (of Agriculture) has been carrying on such work, but during the past year its efforts were greatly extended and more vigorously prosecuted with unusually favorable results.

The Cattle Tick—The progress made in the eradication of the southern cattle tick led to the release from quarantine of 67,308 square miles, the largest area freed in any year since the beginning of the work in 1906. The total free area is now 379,312 square miles, or 52% of that originally quarantined; and the work of the past summer will result in the addition of 79,217 more on December 1. . . .

Hog Cholera—The ravages of hog cholera, the greatest obstacle to increasing hog production, were greatly reduced as a result of the cooperative campaign in 33 States. The method of control involved farm sanitation, quarantine, and the application of anti-hog cholera serum. Data compiled by the Department show that the losses from hog cholera in the year ending March 31, 1918, amounted to only \$32,000,000 as compared with \$75,000,000 in 1914, a reduction of more than 50% in less than five years. Stated in another way, the death rate in the United States was 144 per thousand in 1897, 118 in 1914, and only 42 in 1917, the lowest in 35 years. . . .

Tuberculosis—. . . the most widely destructive disease that now menaces the live stock industry, recently was made the special object of attack. In co-operation with State authorities and live stock owners, a campaign was undertaken in 40 States to eradicate tuberculosis from herds of pure bred cattle, from swine, and in selected areas. . . . D. F. Houston, Secretary of Agriculture.

1921: PROGRESS IN TUBERCULOSIS ERADICATION (221).—The Federal Government appropriated \$1,000,000 to be used for partial indemnity during the year beginning July 1, 1921. This was to be paid only when States contributed an equivalent amount. Before four months of this fiscal year had elapsed the allocation of Federal funds

had been exhausted in a number of States, and here the warfare against tuberculosis must practically stop unless further appropriations are made. . . . It is unfortunate that adequate sums are not available now. Cattle are cheap, the public interest is aroused, and the work of eradication will go forward most satisfactory were the funds at hand. . . . -Henry C. Wallace, Secretary of Agriculture.

DIAMOND SKIN DISEASE OF SWINE (222).—Urticaria or “diamond skin disease” of swine, which is not infrequently encountered by Government inspectors at the various slaughtering establishments in the United States, has long been known to exist in this country. In Europe the etiology of this condition in swine is accepted by different authorities as being the same as the organism causing the acute form of swine erysipelas, i.e. *Bacillus erysipelatus suis*. In other words “diamond skin disease” is simply considered as being a chronic form of the disease. In the United States such skin affections have heretofore been considered of rather minor importance.

There appears to be no case on record in which *B. erysipelas suis* was isolated from swine in the United States, wherein the organism was definitely identified as such. . . .

In this paper it is the intention to outline rather briefly the results of work done and experiments carried out with regard to the organisms isolated in five of the cases which came under our observation showing characteristics typical of *B. erysipelas suis*. . . . - G. T. Creech.

1922: PROGRESS IN TUBERCULOSIS ERADICATION (223).—Gratifying progress has been made in the campaign for the eradication of tuberculosis. All of the States are cooperating in the movement, and at the close of the year 16,216 herds have been accredited and over 1,000,000 herds had passed a first test without reactors. This widespread demonstration of the possibility of freeing individual herds from the disease has resulted in increased confidence in the area clean up method. . . . - H. C. Wallace, Secretary of Agriculture.

TUBERCULOSIS ERADICATION IN CANADA (224).—According to Hilton, D. McEachran as early as 1896 “urged the Canadian Government to pass an act providing for the taking of measures to eradicate bovine tuberculosis.”

During 1922, regulations for the purpose of tuberculin testing the 9,000,000 cattle of Canada were passed. They required that at least two-thirds of the cattle owners in a specified area sign a petition signifying their desire to have the regulations applied to that particular area, etc. While this was a great step forward, the regulations were such as to make slow progress.

1923: PROGRESS IN TUBERCULOSIS ERADICATION (225).—Rapid advances were made in the cooperative campaign to eradicate tuberculosis. An increase of 76% was made in the number of herds of cattle eradicated as free from tuberculosis.

1924: ANIMAL DISEASE WORK PUSHED (226).—The scientific study of animal diseases and parasites has yielded information of practical value in combating these enemies of the live stock industry. A new and very effective immunizing agent against hemorrhagic septicemia has been developed. This infectious disease, which attacks especially cattle, sheep, and swine, is attended with a very high mortality. The protecting product is what is known as an aggression. In the experiments, cattle which had been immunized with this aggression were given 500 times the fatal dose of hemorrhagic septicemia virus with no ill effects, while all untreated cattle given the same dose of virus within 48 hours, . (sic).

In recent years an effective method of controlling stomach worms of sheep by means of repeated dosing at intervals has been worked out. Carbon tetrachloride, which has been found by the department (of agriculture) to be effective against hookworms of dogs, has since come into very extensive use in human medicine for the removal of hookworms and has been used with great success in hundreds of thousands of cases in various parts of the world. - H. C. Wallace, Secretary of Agriculture.

1924-25: FOOT AND MOUTH DISEASE OUTBREAK (227).—The outbreak of foot and mouth disease in California in February, 1924, created the most urgent demand for the services of the Department (of Agriculture) during the year. This outbreak was the most serious menace to American livestock in recent years. Fortunately the department was better prepared than ever before to deal with such an emergency. Plans had been worked out in advance and printed matter and other supplies provided. A picked force headed by trained and experienced veterinarians was placed at work in the affected territory. State and local authorities in California heartily cooperated with the Federal forces and supplied valuable assistance. On the few previous occasions when this highly contagious malady gained entrance into the United States it was brought under control and finally eradicated by methods of quarantine, disinfection and slaughter. This policy was again followed. Strict quarantines were imposed, all infected premises were disinfected. Indemnity based on appraised value was paid to owners of animals and property destroyed. By the end of June the outbreak had been under control. Only a few sporadic cases have since occurred.

In the flight against the disease up to June 30, 1924, there were slaughtered 49,781 cattle, 24,978 sheep, 20,996 swine, and 808 goats. Indemnity charges for animals and other property amounted to \$3,800,000, chargeable half to the Federal Government and half to the State of California. Suppression of the disease presented unusual difficulties, because the infection spread to the horses and flocks on the open range and in the rugged mountain country. In the more rocky regions the problem of burying large herds was especially perplexing. In some instances cattle were driven into a canyon and there killed and the side of the canyon blasted down with dynamite to bury the carcasses. . . .

The source of the last outbreak in this country has not been discovered. The disease first appeared in hogs fed garbage shipped from the Mare Island Navy Yard in the San Francisco Harbor. It therefore seems probable that the infection was carried by shipments from the Orient. - H. M. Gore, Secretary of Agriculture.

Infection Among Deer (228).—The difficulty of eradicating foot and mouth disease was increased by infection among deer in the Stanislaus National Forest. Cooperation with the Bureau of Biological Survey, the Forest Service, the State Department of Agriculture, and the California Fish and Game Commission with the Federal Bureau of Animal Industry made possible the eradication of the disease from the deer in the forest. The last deer showing recent infections was killed June 10, 1925.

Outbreaks in Texas (228).—A separate outbreak of foot and mouth disease in Texas was officially confirmed September 27, 1924, in a herd of Zebu cattle south of Houston. Methods similar to those used in suppressing the California outbreak resulted in the suppression of infection in Texas within 30 days. It seems probable that infection entered Texas through a gulf port, since investigation established no connection between this outbreak and the one in California.

The Bureau Prepared (229).—Where large herds, especially of range cattle, are involved, the actually diseased animals can be slaughtered and immediately incinerated, thus retarding the spread of infection through the herd until the steam shovels have had time to arrive and prepare trenches for the burial of the remaining animals.

The Bureau maintains a force of trained veterinarians and other inspectors who have had experience in previous outbreaks. The entire force is prepared to proceed to the scene of action on telegraphic orders. Its organization is somewhat similar to that of an army, with its supervisory officers selected in advance for important posts. It is made up of units each one of which handles a particular line of work, such as inspections, appraisals, trench digging, slaughter, disinfection, car cleaning, and shipments.

1924-25: OUTBREAK OF EUROPEAN FOWL PEST (228).—In the fall of 1924 the European fowl pest appeared in the United States, menacing poultry flocks. This new, highly contagious malady broke out in the States of Pennsylvania, New York, New Jersey, Connecticut, Indiana, Michigan, West Virginia, Missouri, and Illinois. Most of the infection was limited to the four States first named. To prevent the spread of this disease the department (of agriculture), by official order, prohibited the interstate shipment of live chickens, turkeys, and geese affected with or directly exposed to European fowl pest. The order also required the cleaning and disinfection of premises, cars, coops, and other equipment used in handling interstate shipments of poultry affected with the disease. Affected birds were slaughtered, and, together with the birds that had died, were burned or deeply buried. An appropriation of \$100,000 promptly made by Congress—in the absence of funds available for poultry—disease work in the field—contributed greatly to the thoroughness of control measures. Methods used for suppressing European fowl pest were similar to those used in eradicating foot and mouth disease. By May 1, 1925, the fowl malady was virtually

eradicated; infection subsequently appeared only in the small flock of chickens in New York, where it was promptly suppressed.

In dealing with such pests immediate action is half the battle. The serious effects of the fowl pest outbreak on agriculture and other industries deserves attention. Prices of poultry broke badly when the disease began to spread and producers and distributors suffered heavy losses. Poultry dressing establishments, especially in the East, were obliged to discontinue operations, throwing thousands of employees out of work. - W. M. Jardine, Secretary of Agriculture.

1925: PROGRESS IN TUBERCULOSIS ERADICATION (230).—It is gratifying to report that tuberculosis is yielding to the aggressive campaign against it by Federal, State, and county forces. Improved State laws, liberal State appropriations, and a better understanding of the work by stock owners have aided the work. . . . Tests were applied to over 7,000,000 cattle, of which 3.1% showed infection. . . . The degree of infection, however, varies widely in different State. . . . - W. M. Jardine, Secretary of Agriculture.

IMPENDING DANGER OF HOG CHOLERA OUTBREAK (231).—The swine industry during the last fiscal year experienced the smallest losses from hog cholera since official records of the disease have been kept.

At times hog cholera has taken toll as high as 10% of the swine, whereas last year the loss from this disease alone was only 3%. The lessened prevalence of the disease caused swine owners to give less attention to immunizing their animals, with the result that more swine herds on farms are left susceptible to hog cholera than in other years. Consequently heavy losses may be expected should the disease begin to spread before outbreaks can be checked. Promptness in immunizing swine, should outbreaks appear in a locality, is therefore extremely important if such outbreak is to be checked promptly. - W. M. Jardine, Secretary of Agriculture.

1926: CATTLE GRUB - CAUSE GREAT ECONOMIC LOSS (232).—The loss due to the cattle grub has been estimated at from \$50,000,000 to \$100,000,000 annually, a loss which is felt by several industries. Dairymen have estimated that a reduction of 10 to 25% in milk flow is often due to irritation by the grubs. The growth of young stock is retarded through grub infestation, and cattle raisers and feeders suffer losses accordingly. Butchers and packers lose money on hides that have grub holes in them, hides with five or more holes in them being discounted, according to trade custom, 1 cent a pound. The tanning industry as a whole prefer grub free hides. For certain uses a single hole in the hide makes it unserviceable. The grubs perforate the skin along the back of the animal, thus perforating the portion which is of the greatest value when the hide is tanned, and the extra handling of hides necessary in classifying them as to grubiness is an economic loss. . . .

BOVINE TUBERCULOSIS DECLINING (233).—In the nation wide effort to eradicate tuberculosis from livestock, results have been unusually gratifying. During the fiscal year 109 counties completed a series of tuberculin tests showing that infection had been present to the extent of not over 1%. With the disposal of reactors and establishment of other safeguards the counties were recognized as virtually free from bovine tuberculosis. This number is greater than the total of all previous years and brings the total list of such counties to 198. The acceleration of progress in establishing county-wide areas free from tuberculous cattle supports the belief of department livestock officials that the task of eradicating bovine tuberculosis from the United States is feasible, though still of great magnitude and likely to require many more years. - W. M. Jardine, Secretary of Agriculture.

TUBERCULOSIS ERADICATION AIDED BY THE PRESS (234).—In the campaign of education the most potent influence outside the regular authorities was exercised through the press and agricultural papers. The editors, both of the daily press and of the periodical farm papers, commended the work to the livestock owners, and watching its progress, pointed out from time to time ways by which the method might be improved upon. They encouraged the officials and live stock owners to work together in the great enterprise contemplated—the suppression of the great white plague among livestock of America. Cooperative assistance, however, was not limited to the organization heretofore set forth. . . . More than 6,000 veterinarians have qualified by written examination to do tuberculin testing under the uniform accredited-herd plan.

HOG CHOLERA OUTBREAKS (235).—During the fall of 1926 a situation arose which demonstrated clearly the importance of keeping swine immunized against this highly contagious malady. Owing to the slight extent of cholera in recent years, a very large proportion of swine owners discontinued the practice of immunizing their herds. As a further result the commercial production of serum declined in proportion.

Both of these conditions—large numbers of susceptible animals and shortage of serum—were responsible for extensive outbreaks in several hog-growing States until serum production again met the requirements of the industry.

MOVIES AID TICK ERADICATION (236).—Vigorous opposition . . . has often been met in some sections of the South in the campaign for the eradication of the tick which acts as a carrier of southern cattle fever. Some of the departments (of agriculture) agents, provided with trucks equipped with motion-picture projectors, have gone into these counties with films showing the benefits of tick eradication. Threats have often been made to "blow up the tick wagon" and "beat up" the operator. In one such community long known to be hostile to the project, the department's film, "Molly of Pine Grove Vat", was shown, despite such threats.

The three-reel picture shows how plucky people in one community eradicated ticks in spite of serious obstacles and opposition by a lawless element. The show began before an audience that included a crowd of bullies and local bad men. With the unweaving of the story, however, which showed clearly that only selfishness and prejudice oppose the useful work of tick eradication, opposition melted. The leader, instead of whipping the department's agents, as he had said he would do, shook hands with him before he left. In other districts where opposition has been so strong as to make the efforts of tick eradication hazardous, the power of the silent drama has made friends of former opponents and is preparing the way for better livestock and more prosperous citizens. . . .

RABIES BECOMING MORE PREVALENT (237).—Indifference and lack of fear, together with misguided sentiment and distance from the scene of infection, are factors that may reasonably be held responsible for the prevalence and increase of rabies. Children probably make up the greatest number of victims in homes where rabid animals have been kept as pets. . . .

The large number of animal carcasses submitted for examination to the Bureau of Animal Industry laboratories in Washington, D.C., show that the disease in this vicinity has been steadily and greatly on the increase. During the last year in the pathological laboratory of the bureau 289 suspected cases were examined microscopically for evidence of rabies. Of this number, 146 were found to be positive cases of the disease. All these cases originated in Washington, D.C. or in the suburbs. This number is about three times as great as occurred four years ago. From other evidence, also, there is abundant proof of a rather general increase in many communities. . . . - J. S. Buckley.

1927: PROGRESS IN TUBERCULOSIS ERADICATION (238).—During the year the cooperative campaign conducted by State, local and Federal authorities to eradicate tuberculosis from domestic animals made exceptional progress. . . . Public sentiment has supported this work so admirably that opposition has become largely local and transitory nature. The available funds and favorable public attitude toward tuberculosis eradication made possible a large gain in the number of cattle tested, the number being in excess of 9,700,000. This was about 7% more cattle than were tested during the preceding year.

PROGRESS IN TICK ERADICATION (238).—In the Southern States the eradication of cattle ticks continues to make progress. . . .

The floods occurring in the Mississippi Valley during the year aided tick eradication work somewhat by depositing silt over large areas formerly infested, thus destroying ticks in enormous numbers. Particularly in Louisiana the flood waters advanced the eradication of the pest. When restocked with tick-free cattle such areas should remain free from these parasites. . . .

TUBERCULOSIS IN SWINE AND POULTRY (238).—The suppression of tuberculosis among swine and fowls also received attention during the year. Since hogs are susceptible to the avian type of disease, the successful development and use of a simple tattoo system of marking hogs facilitates this work among both swine and fowls. In conjunction with post-mortem reports on swine, the tattoo system is useful in identifying sources of swine and avian infection, particularly in areas nearly free from tuberculosis. . . .

HOG CHOLERA OUTBREAKS CHECKED (238).—The department (of agriculture) has continued to supervise the manufacture of veterinary biological products produced for sale in interstate and foreign commerce.... A record output of anti-hog cholera serum occurred during the year just closed, being a result of the unusual prevalence of hog cholera in the fall and winter of 1926. Licensed establishments produced more than a billion cc of the protective serum or about 50% more than any former year. The quantity of hog cholera virus was in corresponding proportion.... Most of the deaths of hogs resulting from hog cholera occurred in herds whose owners had not taken the precaution to immunize them.

BACILLARY WHITE DIARRHEA OF CHICKS (239).—As regards the “billion dollars” poultry industry of the United States, no disease probably is of greater moment than bacillary white diarrhea. This malady, like contagious abortion of cattle, strikes a deadly blow at the very fountain head of the industry’s young life....

LOWER MISSISSIPPI FLOOD (240).—A great flood in the lower Mississippi Valley, which did enormous damage in several States, marked the year 1927.... losses were mainly agricultural.... Estimated livestock losses include 25,000 horses, and mules, 50,000 cattle, 150,000 swine, and 1,250,000 poultry....

INDEMNITY FOR JOHNIN REACTORS (241).—The Bureau of Animal Industry has been granted authority by Congress to pay indemnity to cattle owners for animals that are slaughtered because of reaction to the johnin test. These payments are made on the same basis that indemnity is paid on tuberculous cattle.

Indemnity funds have been available for this purpose since July 1, 1927, from which a number of stock owners have received benefits....

1928: BOVINE TUBERCULOSIS GREATLY REDUCED (242).—The estimated extent of bovine tuberculosis in the United States is now officially estimated at about 2% compared with 4% shortly after the cooperative tuberculosis eradication work was begun about a year ago.

INROADS OF ANIMAL PARASITES (242).—Developments in research and regulatory work have directed attention to the serious inroads which many animal parasites make among domestic livestock. Although certain well-known pests, such as cattle ticks, scab mites, and roundworm of swine, are being reduced, hordes of other parasites continue to take enormous toll. The attacks of these pests explain why many young animals die or become unthrifty. Some parasites, notably liver flukes, are invading new territory. The economic losses caused by animal parasites are without question greatly underestimated, since they not only reduce vitality and delay maturity, but also invade tissues and organs and cause a loss of meat. The identity of parasites affecting domestic animals is readily determined in most cases, but effective control measures for many parasites are yet to be developed.

To cope more successfully with this situation the department is extending its research activities. - W. M. Jardine, Secretary of Agriculture.

HEAVY LOSSES DUE TO ABORTION DISEASE (243).—About ten years ago, infectious abortion and tuberculosis rivaled each other for the distinction of being the greatest plague of livestock in the United States. Since that time, tuberculosis has declined materially as the result of systematic eradication, but the abortion disease is a more conspicuous cause than ever of livestock losses. The malady threatens the source of the Native cattle supply and affects the very organ, the udder, on which the entire dairy industry depends.

Abortion disease is responsible for an estimated economic loss of more than \$50,000,000 annually. Losses take the form of calf mortality, reduced milk flow, temporary sterility, and various troubles.... - J. R. Mohler, Chief of the Bureau of Animal Industry.

1929: THE FIRST ACCREDITED STATE (244).—In the February, 1929 number of the Journal of the American Veterinary Medical Association, North Carolina is mentioned as the first State to complete tuberculin testing of all cattle, thus becoming a 100% modified accredited area.

FOOT AND MOUTH DISEASE OUTBREAK (245).—An outbreak of foot and mouth disease in January, 1929, was quickly eradicated. The country had been free from this malady for several years. It principally affects cattle, sheep, swine, and goats, and its great danger lies in the degree to which it reduces meat and milk production, and in the extreme rapidity with which it spreads. The infection entered through garbage from a merchant vessel that had taken on a quantity of fresh meat in South America. The ship docked at San Pedro, California, the harbor of Los Angeles. Hogs on a Los Angeles County ranch developed the disease after being fed garbage from the vessel. Several hundred swine on the same ranch became infected within a few days.

Prompt and vigorous action was necessary. Accordingly the United States Department of Agriculture, cooperating with State and county officials, established a protective quarantine about the hog ranch, and slaughtered and buried the entire herd, number 3,271 animals. Some cattle on near-by premises were slaughtered also. Inspectors then undertook to trace any infection that might have been spread while the disease was in the incubative stage. In a few weeks the disease developed on four other premises within a few miles of one another. All the animals on these premises were promptly slaughtered and buried even when only a few showed symptoms of the disease. By this drastic action the outbreak was restricted to the five premises mentioned. As on previous similar occasions owners of the condemned livestock were reimbursed. . . .

This visitation of foot and mouth disease caused less loss to the livestock industry and less interruption to business than any previous outbreak. It lasted only two months, setting a record in quick eradication. A noteworthy detail of the eradication proceedings was the prompt inclosure of infected or seriously exposed premises with a high fence of chicken wire netting. This barrier restrained dogs, poultry, and other small animals, as well as unauthorized persons, from entering. It aided the guards at the gateways in maintaining a rigid quarantine. The success of the eradication shows the importance of maintaining a well-trained force of veterinarians for such emergencies. . . . A. M. Hyde, Secretary of Agriculture.

EUROPEAN FOWL PEST AGAIN (246).—The infectious poultry malady, European fowl pest, which appeared in the United States in 1924 and was eradicated in 1925, made a second appearance in June, 1929. The outbreak involved 8 premises at Morris County, New Jersey. It was so promptly diagnosed and suppressed that the losses were without economic significance. Eradication was effected essentially through the destruction of affected fowls, and the cleaning and disinfecting of premises.

PROGRESS IN TUBERCULOSIS ERADICATION (246).—Progress is being made in combating bovine tuberculosis, tick fever, hog cholera, sheep and cattle scabies, and various other domestic maladies. In the campaign against bovine tuberculosis more cattle were tested in 1928-29 than in any previous fiscal year. Nearly a million cattle a month were tested, the total in round figures being 11,665,000. The degree of infection found was 1.8% as compared with 3.9% about 8 years ago. These results and other data indicate that tuberculosis among cattle has been reduced more than 50% since systematic eradication began.

State Action—In nearly all States the legislatures were in session during the fiscal year 1929 and, with few exceptions, provided legal authority and appropriations to facilitate bovine tuberculosis eradication.

INFECTIOUS ABORTION A NEW ISSUE (246).—With the gradual suppression of tuberculosis, infectious abortion appears as the greatest plague now affecting our cattle industry. This disease takes an annual toll, from both beef and dairy herds, estimated at fully \$50,000,000. Hence the total damage is considerably more than the figure mentioned. No large part of the country escapes its ravages entirely, though the older dairy sections suffer most.

Stock breeders and dairymen manifest growing interest in the control of this baffling malady.

HEMORRHAGIC SEPTICEMIA PREVENTION (247).—This product—hemorrhagic septicemia aggressin—now prepared commercially, has been an extremely reliable means of reducing losses from hemorrhagic septicemia or shipping fever of cattle. Approximately 3,900,000 doses were prepared in 1927, and over 3,700,000 doses in 1928. The product was manufactured to a greater extent than any other biological agent except blackleg aggressin. Its proved potency and extended use undoubtedly saved livestock owners large sums.

ANAPLASMOSIS OF CATTLE (248).—A disease of cattle known as anaplasmosis, has been found to exist in several Southern and Western States. It generally appears during the summer months in malignant form, and the symptoms and post-mortem findings indicate that it is infectious. The disease has been confused by some with

anthrax and hemorrhagica septicemia. Others have considered it to be a type of forage poisoning. But recent investigations into its nature and cause have shown definitely that the malady is a blood protozoan called anaplasmosis.

... Anaplasmosis is prevalent in many parts of the world. - L. T. Giltner.

CANINE DISTEMPER PREVENTION.—This great canine plague takes a terrific annual toll. As could be expected, much time has been devoted by concerned individuals in an effort to control this disease. Since the beginning of the century many kinds of serums have been developed as preventatives. At the present day the Laidlaw-Dunkin method of immunization is widely used.

SCREW WORM CAUSES HEAVY LOSSES (249).—Losses from the screw worm have been estimated from 4,000,000 to \$10,000,000 annually. The losses are confined largely to the great livestock producing areas of the Southwest. . . .

The screw worm attacks all kinds of livestock and even man. Its ravages are probably the most severe among sheep and goats, but it is a very serious pest of cattle, horses and hogs. The losses caused by the insect are brought about in several ways. The death loss is often considerable, especially in sheep and calves. The former show a marked tendency, when infected, to hide in dense thickets, in which they are often eaten alive by the worms. It is now generally recognized by stockmen that many of the sheep and goats which disappear (their loss frequently being charged to theft or escape as the carcasses are not found at the time) are really caused by screw worms. All heavily infested animals show marked reduction in condition which requires weeks to overcome after the wounds have healed. . . . - F. C. Bishopp.

WARTS OF CATTLE - INTERESTING INFORMATION (250).—Warts are of common occurrence in cattle, particularly in calves. Observations of hides in slaughtering establishments indicate that in certain sections of the country from 15 to 25% of young cattle have these growths, especially during the summer. Since warts often materially reduce the value of cattle hides, this subject is of considerable economic importance . . . a series of experimental studies . . . consisted in bacteriological examination of various wart specimens and also in making inoculations of cattle with the wart material. . . .

... The results indicate that common warts in cattle can be transmitted experimentally to animals under one year of age with a fair degree of regularity. Filtrates of bovine warts, though proved by tests to be free from germs, are capable of producing warty growths when inoculated into the skin of healthy cattle. The warts produced by filtrate inoculations may be transmitted also to other calves. The experiments thus indicate that the cause of common warts in cattle is probably the nature of a filterable virus. - G. T. Creech.

1930: LIVER FLUKE CONTROL.—Complete success terminated a campaign begun 2 years ago in California for the control of liver flukes of cattle and sheep. This pest formerly caused heavy losses, particularly to sheep growers. There were no losses last year from liver flukes in the areas covered by the campaign (451).

1931: HOG CHOLERA HELD IN CHECK.—After a five year period of comparative freedom from hog cholera, the disease began to show some of its old time form during the latter part of the summer and did not show indications of abating until the autumn months were almost past. Under date of December 10, 1931, the Division of Hog Cholera Control, Bureau of Animal Industry, announced that the disease was on the wane, following the use of anti-hog cholera serum for protecting exposed herds and treating others already infected. In some sections the use of the serum was so general that stocks of the product maintained by serum companies were seriously depleted and in some cases completely exhausted.

The financial condition in which many farmers found themselves the past year added to the difficulty of the situation. The inability of some owners to pay for serum imposed new responsibilities on many veterinarians. The prompt assistance of banks in lending money for the purchase of serum, frequently on the advice of local veterinarians, was the only thing that saved the situation in some sections. . . . (452)

MYSTERIOUS BEE DISEASE (453).—A mysterious disease has been killing large numbers of bees in the vicinity of Carson City, Michigan. It is reported that the disease is characterized by a paralysis, and that entire colonies of bees have been wiped out by this disease.

(Note: A mysterious bee disease has been recorded under 1868 as occurring in Indiana, Kentucky, and Tennessee. Under 1871 a bee disease was reported as occurring in Iowa.)

DOURINE IN THE WEST AGAIN (454).—Ten thousand wild horses in the San Carlos Indian Reservation near Coolidge Dam, in Arizona, are to be either destroyed or shipped to rendering plants for slaughter in an effort to eradicate dourine from the State, according to Dr. E. L. Stam, State Veterinarian.

1932: FOOT AND MOUTH DISEASE OUTBREAK (455).—In April, 1932, the United States suffered its 10th invasion of foot and mouth disease, a foreign livestock scourge. It was stamped out in 10 days, largely as a result of effective cooperation by all concerned. None of the previous outbreaks was so quickly eradicated. . . .

BOTULISM IN WESTERN WATER FOWL (456).—It was in 1910 that the western duck sickness known to be a form of botulism, first struck with unexpected violence at Great Salt Lake, Utah, and left in its wake literally hundreds of thousands of dead waterfowl and shore birds. The sheer intensity of this early epizootic has never since been equaled, although certain outbreaks of ensuing years have been strongly reminiscent of that early catastrophe, and the aggregate losses of western bird life from this one malady can truthfully be said to be in the millions.

Even as early as October, 1932, a serious outbreak at the north end of Great Salt Lake left dead water fowl on the south shore of Willard Spur in numbers varying from 8,000 to 10,000 to the linear mile. It was estimated that fully 250,000 birds perished from this form of botulism in this general area in that year. Only three years earlier - 1929 - losses estimated to be from 100,000 to 300,000 birds occurred at the mouth of Bear River nearby. In 1925, 100,000 waterfowl and shore birds died at lake Malheur, Oregon, and the same year in northern California from 25,000 to 50,000 succumbed at Tule Lake. Earlier reports - 1912 - tell of 30,000 actually being picked up on the Weber River Flats, Utah, and more than 44,000 gathered and buried on the grounds of one Utah duck club between August 22 and September 21 of that year. Even from Canada have come reports of tens of thousands dying at certain lakes in years of severe outbreaks. Such cases, of course, are extreme and fortunately are not of annual occurrence, but some birds perish of this sickness each year at all the principal points of infection, and when circumstances conspire to aggravate the menace, the mortality may become a matter of national concern. . . . E. R. Kalmbach. Bureau of Biological Survey.

(Note: A great death of wild ducks was reported under 1908.)

1933: EQUINE ENCEPHALOMYELITIS - HORSE PLAGUE (257).—A disease of horses and mules manifested by nervous symptoms has existed in various sections of the United States for many decades. The affection has been called cerebro spinal meningitis, forage poisoning, blind staggers, sleeping sickness, brain fever, Kansas-Nebraska horse plague, and other names.

Contrary to former beliefs that the disease resulted from spoiled feed and a variety of other causes, research by California investigators showed in 1930 that a specific virus is responsible. At that time it was proposed that the disease be called encephalomyelitis, signifying inflammation of the brain and spinal cord, which is the actual condition.

Since 1930 the causative virus has been found to exist, in the West—in California, Nevada, Utah, and South Dakota; and in the East—in Virginia, Maryland, Delaware, and New Jersey. In addition the disease has been diagnosed in other States. Strong experimental evidence indicates that at least two types of virus, tentatively designated as "western" and "eastern", but the outward appearance of the disease is practically the same in both cases. - L. T. Giltner and M. S. Shanahan.

Giltner and Shanahan further relate (258): "In 1937, the most severe and widespread epizootic of all time occurred; 169,204 cases of the disease being reported from the 30 States in which the disease appeared. Over 90% of these cases were reported from the area drained by the Mississippi and tributaries. Infectious equine encephalomyelitis is essentially a disease of warm weather, reaching a peak during the late summer and early fall, and then disappearing shortly after the occurrence of killing frosts. A district generally and extensively involved by the

disease usually experiences no losses, or at most only sporadic cases, for some years succeeding, although present knowledge does not permit accurate predictions as to future outbreaks in succeeding areas. . . ."

THE SCREW WORM PROBLEM AGAIN.—The screw worm problem in this country has been intensified by the spread of this pest in the Southern States during the summer of 1933. . . .

. . . In many of the costal counties in Texas, Louisiana, Mississippi and Alabama, the stockmen report that their losses among sheep has reached 30 to 40% of their holdings and that the loss among their hogs has been nearly as high. The infestation among cattle is stated to have attained 15 to 20% and that horses and mules 5 to 8%. The percentage of infestation in many counties in Georgia and Florida is equally as high. . . . F. C. Bishopp.

1934: FEDERAL FUNDS FOR THE ELIMINATION OF DISEASED CATTLE (260).—The La Follette amendment to the Jones—Connally Act appropriated \$50,000,000 to be used (1) in the elimination of cattle affected with Bang's disease and bovine tuberculosis, and (2) in the removal of surplus dairy and beef products. Of \$30,000,000 tentatively allotted to disease projects, \$17,000,000 has been set aside for the elimination of cattle affected with Bang's disease, and \$12,000,000 for the elimination of those affected with bovine tuberculosis, \$1,000,000 remaining unallotted. Farmers signing contracts are to receive indemnity payments ranging up to \$20 per head for grade animals and \$50 per head for pure bred animals. It is contemplated that about 1,300,000 disease infected animals will be eliminated over a period of 18 months. . . .

AUGMENTED WORK OF THE BUREAU OF ANIMAL INDUSTRY (261).—The special and emergency work of the Bureau may be divided into five major projects, namely: 1 - Augmented tick eradication; 2 - Intensified drive against tuberculosis; 3 - Inauguration of a field campaign against Bang's disease; 4 - Participation in drouth relief; and 5 - Special meat inspection.

BUFFALO GNATS KILL LIVESTOCK.—Much concerning the destruction of livestock by buffalo gnats has been given, principally, under the years 1884 and 1886. During 1934 it was reported that dense swarms of buffalo gnats stopped spring farming in Arkansas during the latter part of April and killed thousands of dollars worth of livestock, according to new reports. In a ten mile radius of the Ward community, near Little Rock, 30 horses and mules were reported killed by the insects with 38 hours. From southeastern Arkansas, about 50 horses and mules were victims, and from the area near Beebe, 175 head (262).

TULAREMIA OUTBREAK AMONG SHEEP (263).—Tularemia has been found to be transmitted, usually by insects, from infected rodents—principally wild rabbits—to man. One of the most recent outbreaks, which have been rather common throughout the West, occurred in Meagher County, Montana, late in April and early in May, 1934. Jack rabbits died in great numbers, and dead ground squirrels were also noted. Approximately 200 head of a band of sheep grazing in the area died because the cause was discovered to be tularemia. Investigation by specialists of the Public Health Service, the State Boards of Health, and the Bureau of Biological Survey, demonstrated that wood ticks, present in great numbers, were responsible for the transmission of the tularemia from the diseased rodents. The sheep were sheared, dipped and moved to another range, and the Biological Survey inaugurated a campaign to eliminate the rabbits and ground squirrels. . . . A. M. Day and J. E. Shillinger.

RABIES AMONG WILD ANIMALS (264).—Rabies is frequently contracted by coyotes and other predators, probably largely from dogs, and may thus be spread among other wild animals to man. Outbreaks are difficult to control, and it is only through constant vigilance and the work of the expert force of trappers maintained by the Biological Survey that it has been possible to check them. One of the most serious outbreaks in several years occurred in southern Leo County, New Mexico, in February, 1933, and within a month it had assumed alarming proportions. In one case, 18 or 22 sheep bitten by coyotes showed symptoms of rabies and were killed by the owner. . . . Bureau (of Biological Survey) workers, in cooperation with local authorities, instituted a vigorous coyote trapping and poisoning campaign, and within a few months the epizootic was stamped out. In Nevada about the same time the loss of 23 cattle from rabies in Paradise Valley led to the prompt coyote-control measures that stamped out the disease and prevented further serious losses.

In August, 1934, officials of the health and game department of Maine urged that aid be given in controlling an outbreak of rabies near Farmington. The Biological Survey's expert learned that the trouble was localized in a largely wooded farming section, not over 8 miles in diameter, where ten foxes with evidence of rabies had been killed since March. One boy, 3 cows, and 4 dogs were known to have been bitten by the foxes, and two of the cows had died. A rapid spread of the disease among the numerous large and small animals was threatened, but acting on the Bureau's (of Biological Survey) recommendation the State game department immediately employed ten trappers to remove the possible carriers from the locality. By October 1 these men had taken 162 foxes, 107 raccoons, 510 skunks, 117 porcupines, 9 minks 67 woodchucks, and numerous squirrels, muskrats, weasels, and vagrant cats. This action brought the situation under control. . . . - A. M. Day and J. E. Shillinger

1935: ANIMAL INDUSTRY - VETERINARY SCIENCE (265).—Recent contributions of research and the application of veterinary science have exerted a steady influence on stock raising and agriculture. The hog raiser, for instance, who immunizes his herd against hog cholera and who also uses the system of swine sanitation developed by the Department (of Agriculture), operates under a better and safer economic system than was possible before research provided these forms of protection. Ability to control stomach worms, seab mites, and other parasites of sheep likewise have placed the production of that class of livestock on a more secure basis. Still further results of coordinated research and its application have been industrial developments such as the manufacture of biological products, dips, and disinfectants. . . . - Henry A. Wallace, Secretary of Agriculture.

BOVINE TUBERCULOSIS GREATLY REDUCED (265).—An outstanding achievement in establishing healthy foundation herds of cattle has been the extensive, aggressive campaign against tuberculosis. Through the detection and slaughter of diseased cattle, including beef as well as dairy types, cooperating Federal and State officials not only have checked the spread of this disease but have reduced its average degree of prevalence from 4% in 1922 to 0.6% in 1935. This is the most extensive veterinary field campaign conducted in any country at any time. . . . - Henry A. Wallace, Secretary of Agriculture.

BANG'S DISEASE SUPPRESSION (265).—Within the last year the Department of Agriculture has likewise satisfied the appeal of dairymen, in particular, and cattlemen, in general, for assistance in suppressing the costly and insidious malady known as Bang's disease or infectious abortion. In the past this disease has taken a toll from the livestock industry estimated at \$50,000,000 a year. The infection not only caused death of calves and impaired production in the herd, but was a serious handicap in the sale of breeding stock. Many States have restrictions against the entry of animals from infected herds. A further disturbing element was the close relationship between Bang's disease in cattle and undulant fever in man. Considerable evidence indicates that raw milk from a herd so infected may transmit the organism, *Brucella abortus*, from cattle to man.

1937: The severe outbreak of equine encephalomyelitis that occurred during this year has been given under 1933.

SWINE ERYSIPELAS SPREADING (266).—In the early month of 1931, the United States Bureau of Animal Industry, through their representatives, Drs. C. H. Hays and C. F. Harrington, made a tentative survey of the disease as it then existed in South Dakota and positively diagnosed the disease (mainly by the culture method) on twelve farms, in seven townships located in three counties. . . . The United States Bureau of Animal Industry made a survey of the disease, in 1932, which shows that the disease was positively diagnosed, either by culture or by blood agglutination test, to be present on 46 farms in 26 townships and in eleven new counties. The records show that there were 156 cases of infectious diseases of swine erysipelas. It is also shown that all the 14 counties in which the disease exists are east of the Missouri River. Over four more states were added in 1937—Pennsylvania, Tennessee and Washington with one case each, and North Dakota with five cases.

With this limited amount of information, it is quite evident that the disease, originating in what we may call the center of swine population of the Middle West, has spread more rapidly and has become of greater importance within the areas comprising the Mississippi Valley. . . . - Frank Breed.

1938-39: A GREAT BOVINE PLAGUE CONTROLLED (267).—“. . . the work in connection with the eradication of bovine tuberculosis has been conducted in a cooperative manner since 1917 by the various State livestock sanitary authorities and this Bureau (of Animal Industry). As a result, all of the counties in the United States, with the exception of nine in California, are in what is known as the modified tuberculosis-free accredited area, or an area where this disease exists to less than one-half of one percent of the cattle population.”

During the 21-year period 1917 to 1938 (inclusive), 206,304,900 cattle were tested, of which 3,651,520 (1.8%) proved to be reactors. The greatest number of tests for any one year were applied during the year (fiscal) 1935, when 25,237,532 cattle were tested. This proved to be over 10,000,000 more cattle than were tested during any other fiscal year, except 1936, when 22,918,038 cattle were tested.

The greatest number of reactors for any one year were found during the fiscal year 1935, when 376,623 (1.5%) were found. During 1926, it is interesting to note that 323,084 (3.7%) reactors were found though only 8,650,780 cattle were tested.

During the same period (1917-38) the percentage of reacting cattle for the different States range from 0.2% to 7.6%, 29 States produced less than 1%, with 37 States less than 2%, those producing the highest percentages are: Rhode Island (7.6%), Massachusetts (5.7%), New York (4.7%), California (4.2%), Connecticut (4%), New Jersey (3.8%), Delaware (3.5%), Vermont (3.4%), Pennsylvania (3.2%), Maryland (2.6%), New Hampshire (2.4%).

The first State to become a modified accredited area was North Carolina, on October 1, 1928. By the end of 1934, 18 States and Washington, D.C. were classed as modified accredited areas, with 15 additional States being added to the list during 1935 alone, 10 during 1936, 3 during 1937 and one during 1938.

The percentage of tuberculous cattle ranged from 4.0% in 1922 and gradually decreased to 0.4% in 1937.

PROGRESS IN BANG'S DISEASE ERADICATION (267).—“In regard to Bang's disease in cattle, this work was taken up in the same cooperative manner (as the tuberculosis eradication campaign) in July 1934. There are approximately 1,265,000 herds of cattle under supervision at the present time (April 1939), and about 1,800,000 reactors have been removed from the herds up to this time. There have been about 31,000,000 agglutination blood tests applied, many of them being retests of the same herds of cattle. . . .”

THE CATTLE TICK PRACTICALLY ERADICATED (267).—Of the 728,565 square miles originally quarantined (affecting 985 counties of fifteen States, including most of the Southern States plus Texas, Oklahoma and California) on July 1, 1906, by December 1, 1938, only 9,779 square miles (affecting 9 counties) in Texas and 4,709 (affecting 6 counties) in Florida remained under quarantine. Thus by a persistent campaign of over 30 years 98% of the area originally quarantined has been released. With the disappearance of the cattle tick, the dreaded Texas fever disease of cattle will likewise disappear.

THE DISTRIBUTION OF SHEEP SCABIES.—During the six months ended December 31, 1938, sheep scabies was reported from 19 States of the United States as affecting a total of 461 herds comprising 233,547 sheep. The disease, according to the report, was heaviest in Louisiana, where it affected 248 herds, comprising 205,858 sheep. In all the other States mentioned in the report, the disease affected less than 4,000 sheep, with the exception of South Dakota, where 28 herds were infected, involving 10,879 sheep (267).

THE DISTRIBUTION OF CATTLE SCABIES—During the six months ended December 31, 1938, cattle scabies was reported from 10 States in the United States as affecting a total of 47 herds comprising 25,785 cattle. The disease, according to the report, was most prevalent in New Mexico, where there were 12 infected herds involving 15,456 cattle. In all other States mentioned in the report less than 1,500 cattle were involved, with the exception of Nebraska, where 15 herds were infected involving 7,343 cattle (267).

Summary for the Period 1915 to 1939

During this, the last period, the veterinary profession was entrusted with the expenditure of great sums of public money, appropriated by the National and State governments for the eradication and control of animal plagues. That the work of the American veterinary profession was well accomplished is an undeniable fact. That, in

the absence of organized veterinary science, animal plagues would have become unbearably prevalent is but a logical deduction from the facts at hand.

Great strides have been made by the American veterinary profession in the control and eradication of animal plagues. Much yet remains to be done. Even when the ideal state of control and eradication is reached the work of the American veterinary profession towards this end will not be finished, for maintenance and the prevention of recurrence will be sufficient reason for organized veterinary science to ever exist with civilization.

The more important features of this period may be summarized as follows:

1. After a campaign conducted in every State in the United States for a period of 21 years, by 1939 the disease is practically controlled, with every county in the United States, with the exception of nine in California, being a modified tuberculosis-free accredited area.

2. The cattle tick eradication campaign started during 1906, is practically completed, with only 14,488 square miles of the original 728,565 yet under quarantine. With the tick eradicated the dreaded Texas fever disease will be incommunicable.

3. Four distinct and separate outbreaks of foot and mouth disease (1924-25, 1929, 1932) completely eradicated.

4. Two outbreaks of European fowl pest completely eradicated.

5. Campaign against Bang's disease inaugurated during 1934.

6. Several outbreaks of equine encephalomyelitis, with an especially severe outbreak during 1937.

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